Special ANNOUNCEMENT

Two significant changes will take place at the Clearinghouse in July 1968. We suggest you take note of these changes in order to receive the best possible service.

IMPROVED REQUEST PROCESSING SYSTEM

The Clearinghouse will implement an automated document request processing system on July 1, 1968, which will increase our efficiency in handling orders using coupons. This change emphasizes the importance of ordering documents from the Clearinghouse by coupon. There will be two ways of ordering by coupon.

Prepaid Coupons

The Clearinghouse prepaid coupon is a tabulating card with a face value of the purchase price of a paper copy or microfiche of a document. The prepaid coupon permits the Clearinghouse to exercise accurate control of orders on data processing equipment. The coupon expedites service since it serves as the method of payment, order form, shipping label, and receipt of sale.

Under the improved processing system an order by prepaid coupon should be shipped within two days after it is received by the Clearinghouse. Non-coupon orders will require a longer processing time.

Deposit Accounts Coupons

A second method of purchasing reports by coupon will be the Clearinghouse Deposit Account. Special order coupons will be made available to deposit account holders to use in ordering documents to be charged against their accounts.

The minimum initial deposit is $25.00. Deposit account holders receive a monthly statement showing any charges and their remaining balance. There will be a small monthly service charge for a deposit account.

NEW ORDERING PROCEDURES FOR DDC USERS

On July 1, 1968, the Defense Documentation Center (DDC) will implement a new Department of Defense policy under which DDC users requesting hard copy of DoD technical reports (from DDC) are subject to a charge for such service. Reports in microform will continue to be available to all DDC users at no charge. The service charge for providing hard (paper) copies of those technical reports available in microfiche form (generally those accessioned by DDC after July 1965) is $3.00 in most cases. Requests for paper copies of these reports must contain prepayment and be sent to:

Clearinghouse for Federal Scientific & Technical Information
U.S. Department of Commerce
Springfield, Virginia 22151

Other DDC services such as report bibliographies and hard (paper) copies of DDC technical reports not available in microfiche form, will continue to be provided at no charge. Request for such services should be made on the appropriate DDC form and mailed to DDC.

The Clearinghouse coupons may be used to remit the DDC user service charge.

Although DDC users will not have to register with the Clearinghouse they will be requested to include their DDC user code, DoD contract number and routing information on all orders. The Clearinghouse coupon will contain appropriate spaces for this information.

U.S.GOVERNMENT RESEARCH & DEVELOPMENT REPORTS

Vol. 68, No. 12

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RESEARCH & DEVELOPMENT REPORTS & TRANSLATIONS 1

REPORT LOCATOR LIST FOR REPORTS IN THIS ISSUE ..... A

INDEXES. Subject, Personal Author, Corporate Author, Contract Number, and Accession/Report Number Indexes are published in the corresponding issue of U.S. GOVERNMENT RESEARCH & DEVELOPMENT REPORTS INDEX (*formerly* **Government-Wide Index**).

INTRODUCTION

R&D REPORTS AND TRANSLATIONS

U.S. Government Research & Development Reports (USGRDR) is a semi-monthly abstract journal. *USGRDR* announces reports of U.S. Government-sponsored R&D released to the public through the Clearinghouse by the Atomic Energy Commission (AEC), Department of Defense (DoD), National Aeronautics & Space Administration (NASA), and other U.S. Government Departments and Agencies; U.S. Government-sponsored translations; and some foreign reports written in English. Most documents announced in *USGRDR* are for sale to the public.

Translations can be identified in *USGRDR* by accession numbers prefixed by the letters "TT", "JPRS", or by a "PB" number followed by the letter "T"; or by a descriptive note in the cataloging information.

COMPUTER PRODUCED

The journal is produced by computer from machineable records generated by the Clearinghouse, AEC, DoD, and NASA which are converted into compatible machine language and electronically composed at the Government Printing Office.

22 SUBJECT CATEGORIES

In the body of the journal, reports are announced in 22 subject categories called "Fields." Each Field is divided into subcategories called "Groups." The subject arrangement follows the *COSATI Subject Category List* (AD-612 200). An edge index on the back cover provides easy access to the Fields within the journal.

JOURNAL FORMAT

A typical entry includes the title (in bold face type), basic bibliographic information, descriptive terms, an abstract in most cases, the accession number, and price. Sample entries follow.

No abstracts are given at this time for AEC and NASA reports, instead the reader is referred to the journal of original announcement—*Nuclear Science Abstracts (NSA)* or *Scientific & Technical Aerospace Reports (STAR)*. When machine conversion programs are complete, AEC and NASA abstracts will be included.

Descriptors and identifiers provide added subject definition. Descriptors considered of most value appear first in parentheses with their modifiers. Only those descriptors preceded by an asterisk are included in the subject index.

Reports covering more than one subject are announced in the primary field and cross-referenced to other fields.

In the "Research Highlights" section, reports of current high industrial interest are reviewed. These reports may be included in this issue of the journal.

A Locator List at the end of the journal gives the COSATI Field/Group location of each report cited in this issue.

ORDER REPORTS FROM CFSTI

Order reports from the Clearinghouse (CFSTI), Springfield, Virginia 22151, unless another source is specified in the journal entry. Order by accession number (given in the last line of the entry). Prepayment is required by CFSTI coupon, check, or money order. Make check or money order payable to the Clearinghouse.

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Most Clearinghouse reports are sold for $3 in paper copy (HC) and 65¢ in microfiche. The $3 price applies only to orders of less than five copies of a single report. For larger quantities of a single report, obtain a price quotation from the Clearinghouse. Reports available from other sources are priced as shown in the announcement.

COUPONS FOR FASTER SERVICE

Use CFSTI prepaid coupons for faster service. Coupons for the purchase of paper copy documents are $3 each (or in books of 10 coupons for $30). Coupons for the purchase of microfiche are in books of 50 coupons for $32.50. Forms for the purchase of coupons are printed at the back of this journal.

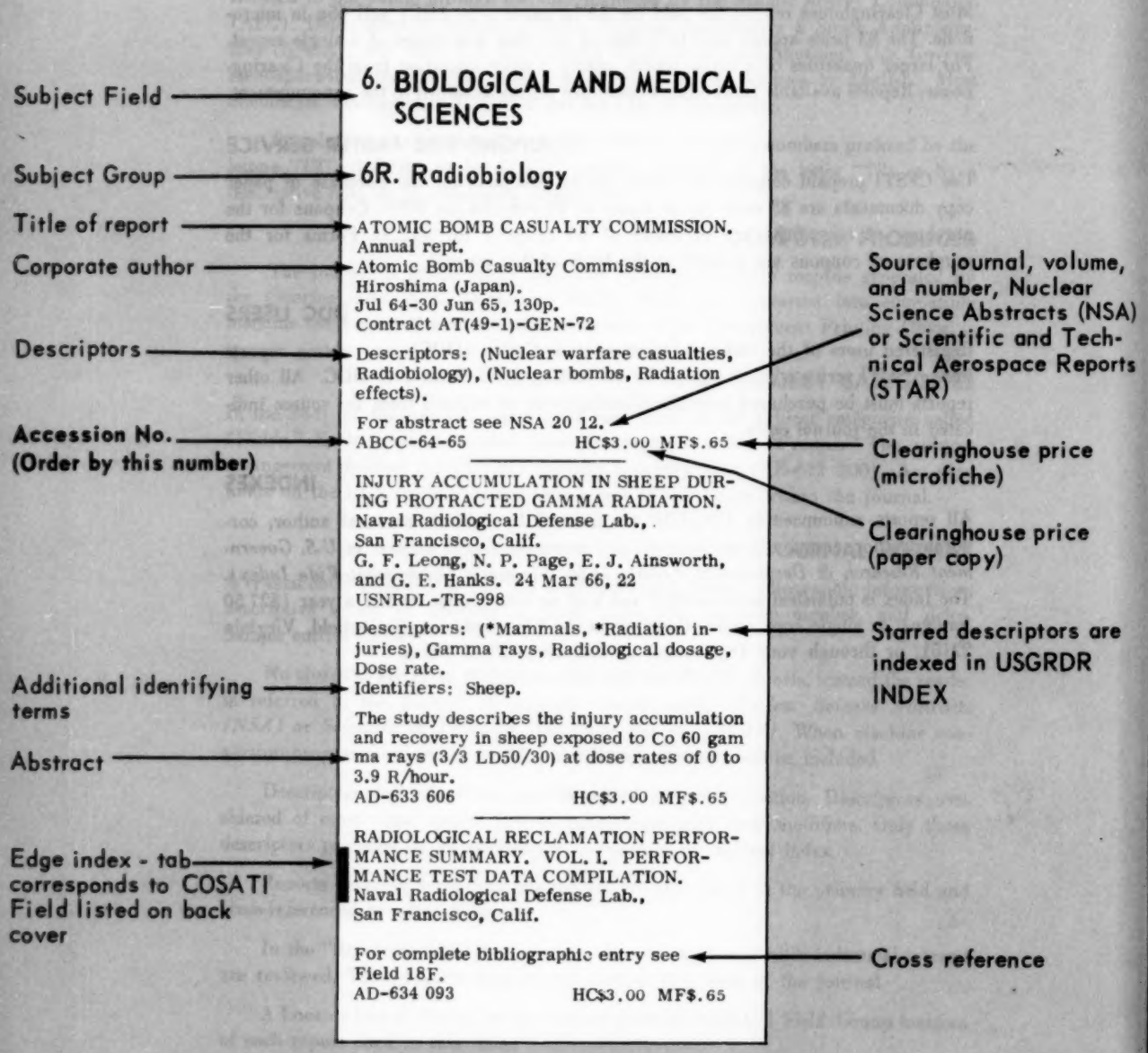
DDC USERS

Registered users of the Defense Documentation Center (DDC) may obtain reports in the "AD" series without charge by submitting DDC Form 1 to DDC. All other reports must be purchased from the Clearinghouse or ordered from the source indicated in the journal entry.

INDEXES

All reports announced in *USGRDR* are indexed by subject, personal author, corporate author, contract/grant number, and accession/report number in *U.S. Government Research & Development Reports Index* (formerly *Government-Wide Index*). The Index is published semi-monthly and sold on subscription at $22 a year ($27.50 foreign) or single copy at $3. Order from the Clearinghouse, Springfield, Virginia 22151, or through your Department of Commerce Field Office.

SAMPLE JOURNAL ENTRIES


Subject Field
6. BIOLOGICAL AND MEDICAL SCIENCES
Subject Group
6R. Radiobiology
Title of report
ATOMIC BOMB CASUALTY COMMISSION. Annual rept.
Corporate author
Atomic Bomb Casualty Commission, Hiroshima (Japan).
Jul 64-30 Jun 65, 130p.
Contract AT(49-1)-GEN-72
Descriptors
Descriptors: (Nuclear warfare casualties, Radiobiology), (Nuclear bombs, Radiation effects).
Source journal, volume, and number, Nuclear Science Abstracts (NSA) or Scientific and Technical Aerospace Reports (STAR)
For abstract see NSA 20 12.
Accession No. (Order by this number)
ABCC-64-65 HC$3.00 MF$.65
Clearinghouse price (microfiche)
Clearinghouse price (paper copy)
INJURY ACCUMULATION IN SHEEP DURING PROTRACTED GAMMA RADIATION.
Naval Radiological Defense Lab., San Francisco, Calif.
G. F. Leong, N. P. Page, E. J. Ainsworth, and G. E. Hanks. 24 Mar 66, 22
USNRDL-TR-998
Descriptors: (*Mammals, *Radiation injuries), Gamma rays, Radiological dosage, Dose rate.
Starred descriptors are indexed in USGRDR INDEX
Additional identifying terms
Identifiers: Sheep.
Abstract
The study describes the injury accumulation and recovery in sheep exposed to Co 60 gamma rays (3/3 LD50/30) at dose rates of 0 to 3.9 R/hour.
AD-633 606 HC$3.00 MF$.65
Edge index - tab corresponds to COSATI Field listed on back cover
RADIOLOGICAL RECLAMATION PERFORMANCE SUMMARY. VOL. I. PERFORMANCE TEST DATA COMPILATION.
Naval Radiological Defense Lab., San Francisco, Calif.
For complete bibliographic entry see Field 18F.
Cross reference
AD-634 093 HC$3.00 MF$.65

SUBJECT FIELD AND GROUP STRUCTURE

(Use Edge Index on back cover to locate subject Field in the journal)

FIELD 1. AERONAUTICS

Includes the following Groups: Aerodynamics; Aeronautics; Aircraft; Aircraft Flight Control and Instrumentation; Air Facilities.

FIELD 2. AGRICULTURE

Includes the following Groups: Agricultural Chemistry; Agricultural Economics; Agricultural Engineering; Agronomy and Horticulture; Animal Husbandry; Forestry.

FIELD 3. ASTRONOMY AND ASTROPHYSICS

Includes the following Groups: Astronomy; Astrophysics; Celestial Mechanics.

FIELD 4. ATMOSPHERIC SCIENCES

Includes the following Groups: Atmospheric Physics; Meteorology.

FIELD 5. BEHAVIORAL AND SOCIAL SCIENCES

Includes the following Groups: Administration and Management; Documentation and Information Technology; Economics; History, Law, and Political Science; Human Factors Engineering; Humanities; Linguistics; Man-machine Relations; Personnel Selection, Training, and Evaluation; Psychology (Individual and Group Behavior); Sociology.

FIELD 6. BIOLOGICAL AND MEDICAL SCIENCES

Includes the following Groups: Biochemistry; Bioengineering; Biology; Bionics; Clinical Medicine; Environmental Biology; Escape, Rescue, and Survival; Food, Hygiene and Sanitation; Industrial (Occupational) Medicine; Life Support; Medical and Hospital Equipment; Microbiology; Personnel Selection and Maintenance (Medical); Pharmacology; Physiology; Protective Equipment; Radiobiology; Stress Physiology; Toxicology; Weapon Effects.

FIELD 7. CHEMISTRY

Includes the following Groups: Chemical Engineering; Inorganic Chemistry; Organic Chemistry; Physical Chemistry, Radio and Radiation Chemistry.

FIELD 8. EARTH SCIENCES AND OCEANOGRAPHY

Includes the following Groups: Biological Oceanography; Cartography; Dynamic Oceanography; Geochemistry; Geodesy; Geography; Geology and Mineralogy; Hydrology and Limnology; Mining Engineering; Physical Oceanography; Seismology; Snow, Ice, and Permafrost; Soil Mechanics; Terrestrial Magnetism.

FIELD 9. ELECTRONICS AND ELECTRICAL ENGINEERING

Includes the following Groups: Components; Computers; Electronic and Electrical Engineering; Information Theory; Subsystems; and Telemetry.

FIELD 10. ENERGY CONVERSION (Non-propulsive)

Includes the following Groups: Conversion Techniques; Power Sources; Energy Storage.

FIELD 11. MATERIALS

Includes the following Groups: Adhesives and Seals; Ceramics, Refractories, and Glasses; Coatings, Colorants, and Finishes; Composite Materials; Fibers and Textiles; Metallurgy and Metallography; Miscellaneous Materials; Oils, Lubricants, and Hydraulic Fluids; Plastics; Rubbers; Solvents, Cleaners, and Abrasives; Wood and Paper Products.

FIELD 12. MATHEMATICAL SCIENCES

Includes the following Groups: Mathematics and Statistics; Operations Research.

FIELD 13. MECHANICAL, INDUSTRIAL, CIVIL, AND MARINE ENGINEERING

Includes the following Groups: Air Conditioning, Heating, Lighting, and Ventilating; Civil Engineering; Construction Equipment, Materials, and Supplies; Containers and Packaging; Couplings, Fittings, Fasteners, and Joints; Ground Transportation Equipment; Hydraulic and Pneumatic Equipment; Industrial Processes; Machinery and Tools; Marine Engineering; Pumps, Filters, Pipes, Fittings, Tubing, and Valves; Safety Engineering; Structural Engineering.

FIELD 14. METHODS AND EQUIPMENT

Includes the following Groups: Cost Effectiveness; Laboratories, Test Facilities, and Test Equipment; Recording Devices; Reliability; Reprography.

FIELD 15. MILITARY SCIENCES

Includes the following Groups: Antisubmarine Warfare; Chemical, Biological, and Radiological Warfare; Defense; Intelligence; Logistics; Nuclear Warfare; Operations, Strategy, and Tactics.

FIELD 16. MISSILE TECHNOLOGY

Includes the following Groups: Missile Launching and Ground Support; Missile Trajectories; Missile Warheads and Fuses; Missiles.

FIELD. 17. NAVIGATION, COMMUNICATIONS, DETECTION, AND COUNTERMEASURES

Includes the following Groups: Acoustic Detection; Communications; Direction Finding; Electromagnetic and Acoustic Countermeasures; Infrared and Ultraviolet Detection; Magnetic Detection; Navigation and Guidance; Optical Detection; Radar Detection; Seismic Detection.

FIELD 18. NUCLEAR SCIENCE AND TECHNOLOGY

Includes the following Groups: Fusion Devices (Thermonuclear); Isotopes; Nuclear Explosions; Nuclear Instrumentation; Nuclear Power Plants; Radiation Shielding and Protection; Radioactive Wastes and Fission Products; Radioactivity; Reactor Engineering and Operation; Reactor Materials; Reactor Physics; Reactors (Power); Reactors (Non-power); SNAP Technology.

FIELD 19. ORDNANCE

Includes the following Groups: Ammunition, Explosives, and Pyrotechnics; Bombs; Combat Vehicles; Explosions, Ballistics, and Armor; Fire Control and Bombing Systems; Guns; Rockets; Underwater Ordnance.

FIELD 20. PHYSICS

Includes the following Groups: Acoustics; Crystallography; Electricity and Magnetism; Fluid Mechanics; Masers and Lasers; Optics; Particle Accelerators; Particle Physics; Plasma Physics; Quantum Theory, Solid Mechanics; Solid-state Physics; Thermodynamics; Wave Propagation.

FIELD 21. PROPULSION AND FUELS

Includes the following Groups: Air-breathing Engines; Combustion and Ignition; Electric Propulsion; Fuels; Jet and Gas Turbine Engines; Nuclear Propulsion; Reciprocating Engines; Rocket Motors and Engines; Rocket Propellants.

FIELD 22. SPACE TECHNOLOGY

Includes the following Groups: Astronautics; Spacecraft; Spacecraft Trajectories and Reentry; Spacecraft Launch Vehicles and Ground Support.

RESEARCH highlights

Reports of current high industrial interest

Highlighted documents (unless otherwise noted) are $3.00 each for paper copy and 65 cents for microfiche.

Categories

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Engineering and Construction	viii
Power Source Devices	ix
Mechanical Equipment	ix
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Fluid- and Aerodynamics

AERODYNAMIC CHARACTERISTICS OF COMPLEX HYPERSONIC VEHICLE SHAPES can now be determined by a digital computer program system. The analysis system consists of four basic program components under the control of an executive main program. These components are the Aerodynamic Force Program, the Picture Drawing Program, the Output Data Plotter Program, and the Slab Delta Geometry Generation Program. Together, these components provide the necessary capabilities for performing all tasks required in preliminary-design aerodynamic analyses of hypersonic shapes.

The outstanding features of this system are its flexibility in covering a very wide variety of problems and the multitude of program options available. The program output is very comprehensive and includes all standard static aerodynamic coefficients, static- and dynamic-stability

derivatives, and control surface characteristics and derivatives, including flow separation effects. Viscous forces are also calculated and include viscous-inviscid interaction effects. The geometric description techniques in this program provide the capability of handling completely arbitrary three-dimensional shapes. The procedure developed to check the accuracy of the geometric data uses a computer and automatic recorder to draw pictures of the vehicle viewed from any angle. Program output data are available in both printed and plotted form.

The report describing the program system is available in two volumes. ORDER. . . . . AD-817 158 -- HYPERSONIC ARBITRARY-BODY AERODYNAMIC COMPUTER PROGRAM, VOLUME I, USER'S MANUAL. . . . . A. E. Gentry, Douglas Aircraft Group, Long Beach, Calif., for the Air Force, Mar. 68, 291p. Also available: AD-817 159 -- Same Title, VOLUME II, PROGRAM FORMULATION AND LISTINGS, 559p.

Printing, Graphic Arts, Photography

A CRANZ-SCHARDIN MULTIPLE SPARK SOURCE PHOTOGRAPHIC SYSTEM having a maximum framing rate of 10^6 frames per second is described in a report prepared at the College of Engineering, University of Michigan. The major components of the system are triggerable air-gap spark light sources, a solid state delay network, a converted portrait camera, associated optics, and mounting hardware. The report describes the uses and limitations of the system; the system can be used in the study of such events as bubble collapse and high-velocity liquid impacts, and in Schleiren or shadowgraph studies. ORDER. . . . . AD-667 386 -- DEVELOPMENT OF A CRANZ-SCHARDIN PHOTOGRAPHIC SYSTEM CAPABLE OF 10^6 FRAMES PER SECOND FOR STUDY OF BUBBLE COLLAPSE AND LIQUID JET IMPACT. . . . . C. L. Kling, Univ. of Michigan, Ann Arbor, for the National Science Foundation and Army Research Office, Jan. 68, 19p.

Engineering and Construction

THE SHIELDING EFFECTIVENESS OF MATERIALS normally used in the construction of buildings housing electronic equipment has been studied at The Electro-Mechanics Co. The first order parameters of the study were wall materials, configurations, and entry via seams, doors, windows, power lines, and roofing, among others. The most important conclusions reached in the study are as follows: (1) Shadowgraphs of the magnetic field distribution of miniaturized enclosures will show where to place electronic equipment in the enclosure. (2) The use of reinforcing steel rods does not provide the proper degree of homogeneity in a wall to allow good shielding. Expanded metal plates have

good homogeneity; they are also strong and have good bonding characteristics. (3) Ferromagnetic materials are needed for shielding at frequencies below 1 kHz. Conductive sheets or expanses of metals are responsible for shielding at frequencies above several kHz. (4) Dielectric construction materials, such as concrete, brick, stone, and plaster offer no significant shielding at frequencies below 100 MHz. (5) The presence of metal fixtures and furniture in an enclosure can cause apparent shielding which is not homogeneous throughout the enclosure. This can give misleading results in the measurement of the shielding effectiveness of a building or room. ORDER. . . . . AD-667 546 -- EM SHIELDING OF BUILDING MATERIALS. . . . . C. M. Brennan et al., The Electro-Mechanics Co., Austin, Texas, for the Air Force, Feb. 68, 183p.

Power Source Devices

THE REPORT OF A SYMPOSIUM ON POWER SYSTEMS FOR ELECTRIC VEHICLES, held at Columbia University, April 6 through 8, 1967, is now available from the Clearinghouse. The report contains 32 papers presented at the Symposium in the following general catagories: (1) Problems in Our Cities, including reports on general alternatives to the gasoline engine, the impact of electric vehicles on urban problems, and the impact of the electric power system on urban traffic flow, control, and facilities; (2) Types Of Power Sources, includes reviews of system developments and several kinds of hybrids; (3) Auxiliary Systems, including component developments, and other aspects of the total vehicle system; and (4) Batteries and Fuel Cells, including the status of current research on specific energy-storage systems and how they perform. ORDER. . . . . PB-177 706 -- POWER SYSTEMS FOR ELECTRIC VEHICLES. . . . . H. B. Linford (Chairman), Columbia Univ., New York, N. Y., for U. S. Dept. of Health, Education and Welfare, 1967, 324p.

Mechanical Equipment

THE PRESENCE OF CONDENSATE IN A STEAM LUBRICATION FILM has been identified as a prerequisite for " Steam Hammer" instability in externally pressurized steam-lubricated journal bearings. A report recently prepared by workers at Mechanical Technology Inc. identifies the source or sources of condensate in the bearing film and the effects the bearing configuration and operating conditions have on the inception of condensation within the bearing film and in the region of the bearing feed holes. It is shown that jacketing the vapor lubrication film with a manifold of condensing supply steam can maintain the bearing and shaft surfaces of the vapor lubrication film superheated with respect to the local saturation conditions of the film. The report also describes a thermal analysis that shows a dual manifold arrangement

resulting in essentially isothermal vapor film conditions. ORDER. . . . . AD-665 283 -- STEAM BEARING STUDIES, PART II, THERMAL ENVIRONMENTAL ANALYSIS OF AN EXTERNALLY PRESSURIZED STEAM BEARING. . . . . F. C. Hsing and D. E. Dougherty, Mechanical Technology Inc., Latham, N. Y., for the Navy, Oct. 67, 45p. Also available: AD-663 177 -- STEAM LUBRICATION STUDIES, PART I, EXPERIMENTAL INVESTIGATION OF A STEAM LUBRICATED JOURNAL BEARING, F. K. Orcutt et al., Nov. 67, 71p.

Transportation

A BASIS FOR INTERAGENCY PLANNING AND PROGRAM COORDINATION ON RAPID EXCAVATION TECHNOLOGY (RET) has been established by workers at Operations Research Inc. as the result of a study sponsored by the U. S. Bureau of Mines. The general study objective was to identify user needs for new developments in rapid excavation technology and estimate the cost and benefits of such developments to society, the government, and industry in order to provide a basis for developing an interagency R & D program. Specific study objectives included the determination of time-phased demand implied by present and new types of end-use functions which represent potential applications for RET; identification of the technological conditions and constraints posed by such applications; and the identification of potential industry impacts of new developments in RET. ORDER. . . . . PB-177 784 -- PROJECTION OF APPLICATIONS AND NATIONAL BENEFITS OF A NEW RAPID EXCAVATION TECHNOLOGY. . . . . A. Lago et al., Operations Research Inc., Silver Spring, Md., for the Bureau of Mines, Sept. 67, 187p.

A THREE-DIMENSIONAL METHOD FOR CALCULATING THE TRANSVERSE STRENGTH OF A SHIP HULL based on the orthotropic plate theory has been developed, and the FORTRAN IV computer program utilizing this method is described in a report recently prepared at the University of California. The method described in the report can be used to design ship-bottom structures, taking into account the restraining effect of side shells, and to obtain information on how much load can be transmitted to side shells and bulkheads in modern tankers. The report also contains an investigation of the response of each structural member to the applied lateral and in-plane loads, and the influence of the applied loads on the geometrical configuration of the structure on the restraining edge moments. Computed results for several problems are compared with those obtained by finite element technique, Schade's design curves, and two-dimensional calculation. ORDER. . . . .PB-177 625 -- TRANSVERSE STRENGTH OF A SHIP HULL UNDER LATERAL AND IN-PLANE LOADS. . . . . H. -W. Huang, Univ. of Calif., Berkeley, for the U.S. Maritime Admin., Dec. 67, 276p.

R&D REPORTS AND TRANSLATIONS

1. AERONAUTICS

1A. Aerodynamics

A GENERAL METHOD FOR DETERMINING THE AERODYNAMIC CHARACTERISTICS OF FAN-IN-WING CONFIGURATIONS. VOLUME I. THEORY AND APPLICATION.
Boeing Co Renton Wash Commercial Airplane Div
For primary bibliographic entry see Field 1C.
AD-667 980 HC$3.00 MF$0.65

GENERAL METHOD FOR DETERMINING THE AERODYNAMIC CHARACTERISTICS OF FAN-IN-WING CONFIGURATIONS. VOLUME II. COMPUTER PROGRAM DESCRIPTION.
Boeing Co Renton Wash
For primary bibliographic entry see Field 1C.
AD-667 981 HC$3.00 MF$0.65

THE STABILITY OF A WEDGE-SHAPED AIRFOIL IN A SUPERSONIC FLOW.
Johns Hopkins Univ Silver Spring Md Applied Physics Lab
For primary bibliographic entry see Field 1C.
AD-667 998 HC$3.00 MF$0.65

ON THE APPLICATION OF THE 'LAW OF PLANE SECTIONS' TO THE DETERMINATION OF THE AERODYNAMIC FORCES ACTING ON OSCILLATING SHELLS,
Foreign Technology Div Wright-Patterson AFB Ohio
For primary bibliographic entry see Field 20D.
AD-668 031 HC$3.00 MF$0.65

ON THE CALCULATION OF UNSTEADY NONLINEAR THREE-DIMENSIONAL SUPERSONIC FLOW PAST WINGS,
Stanford Univ Calif Dept of Aeronautics and Astronautics
For primary bibliographic entry see Field 1C.
AD-668 069 HC$3.00 MF$0.65

AEROELASTIC STABILITY CHARACTERISTICS OF CYLINDRICAL SHELLS CONSIDERING IMPERFECTIONS AND EDGE CONSTRAINT,
Texas Univ Austin Dept of Aerospace Engineering
For primary bibliographic entry see Field 1C.
AD-668 074 HC$3.00 MF$0.65

ENTROPY OF TURBULENT GAS: MACROSCOPIC AND TURBULENT PARTS. BOUNDARY-LAYER: EXPRESSIONS FOR CELERITIES OF FILTERED FLUCTUATIONS; FIRST MEASUREMENTS FOR TEMPERATURE FLUCTUATIONS.
Aix-Marseille Univ (France) Institut de Mecanique Statistique de La Turbulence
For primary bibliographic entry see Field 20D.
AD-668 083 HC$3.00 MF$0.65

HEAT EXCHANGE OF BODIES OF DIFFERENT FORM WITH TURBULENT FLOW OF AIR,
Foreign Technology Div Wright-Patterson AFB Ohio
For primary bibliographic entry see Field 20M.
AD-668 096 HC$3.00 MF$0.65

SUPERSONIC FLOW PAST BODIES OF ROTATION WITH ANNULAR GAP,
Foreign Technology Div Wright-Patterson AFB Ohio
For primary bibliographic entry see Field 1C.
AD-668 103 HC$3.00 MF$0.65

INTERFERENCE MEASUREMENTS MASS TRANSFER IN A TURBULENT BOUNDARY LAYER OF A PERMEABLE SURFACE,
Foreign Technology Div Wright-Patterson AFB Ohio
For primary bibliographic entry see Field 20D.
AD-668 112 HC$3.00 MF$0.65

STABILITY OF A THREE-LAYER ORTHOTROPIC PLATE IN A SUPERSONIC GAS FLOW,
Foreign Technology Div Wright-Patterson AFB Ohio
For primary bibliographic entry see Field 1C.
AD-668 121 HC$3.00 MF$0.65

STATISTICAL ANALYSIS OF TEMPERATURE DATA FROM WIND TUNNEL TEST OF A VON KARMAN RADOME.
Johns Hopkins Univ Silver Spring Md Applied Physics Lab
For primary bibliographic entry see Field 17I.
AD-668 135 HC$3.00 MF$0.65

AIR PROPERTIES AND FLOW CONDITIONS AROUND THE NOSE OF A BLUNT RADOME.
Johns Hopkins Univ Silver Spring Md Applied Physics Lab
For primary bibliographic entry see Field 17I.
AD-668 145 HC$3.00 MF$0.65

CERTAIN PROBLEMS OF GAS DYNAMICS OF STREAMS IN TRANSVERSE FLOW DURING BURNING,
Foreign Technology Div Wright-Patterson AFB Ohio
For primary bibliographic entry see Field 21B.
AD-668 156 HC$3.00 MF$0.65

INVESTIGATION OF THE WAKE BEHIND A CYLINDER AT COINCIDENCE OF A NATURAL FREQUENCY OF VIBRATION OF THE CYLINDER AND THE VORTEX SHEDDING FREQUENCY.
Massachusetts Inst of Tech Cambridge Engineering Projects Lab
For primary bibliographic entry see Field 20D.
AD-668 170 HC$3.00 MF$0.65

SOME ASPECTS OF CYLINDRICAL SHELL PANEL FLUTTER.
Texas Univ Austin Dept of Aerospace Engineering
For primary bibliographic entry see Field 20D.
AD-668 218 Not available from CFSTI.

CALCULATION OF PLANE AND AXIALLY-SYMMETRICAL SUPERSONIC FLOWS IN THE PRESENCE OF IRREVERSIBLE PROCESSES,
Foreign Technology Div Wright-Patterson AFB Ohio
For primary bibliographic entry see Field 1C.
AD-668 232 HC$3.00 MF$0.65

THERMO-MOLECULAR PRESSURE EFFECTS IN TUBES AND AT ORIFICES,
Advisory Group for Aerospace Research and Development Paris (France)
For primary bibliographic entry see Field 14B.
AD-668 251 HC$3.00 MF$0.65

FURTHER CALCULATIONS FOR HYDROGEN INJECTION INTO LAMINAR BOUNDARY LAYER FLOW,
California Univ San Diego La Jolla Dept of the Aerospace and Mechanical Engineering Sciences
For primary bibliographic entry see Field 20D.
AD-668 289 Not available from CFSTI.

BASES OF GAS DYNAMICS AND THEIR APPLICATION TO THE CALCULATION OF SUPERSONIC WIND TUNNELS,
Foreign Technology Div Wright-Patterson AFB Ohio
For primary bibliographic entry see Field 20D.
AD-668 292 HC$3.00 MF$0.65

HYPERSONIC PITCH-DAMPING SUPPORT USING WATER-COOLED BALL BEARINGS.
Naval Ordnance Lab White Oak Md
For primary bibliographic entry see Field 20D.
AD-668 325 HC$3.00 MF$0.65

A NOTE ON THE MIXING OF TWO PARALLEL SUBSONIC STREAMS,
New York Univ N Y
For primary bibliographic entry see Field 20D.
AD-668 373 Not available from CFSTI.

ON A CONVERGENT MULTI-MOMENT METHOD FOR THE LAMINAR BOUNDARY LAYER EQUATIONS.
Aerospace Research Labs Wright-Patterson AFB Ohio
For primary bibliographic entry see Field 20D.
AD-668 413 Not available from CFSTI.

MERGED STAGNATION SHOCK LAYER OF NONEQUILIBRIUM DISSOCIATING GAS,
Aerospace Corp El Segundo Calif El Segundo Technical Operations
For primary bibliographic entry see Field 22B.
AD-668 442 HC$3.00 MF$0.65

BOUNDARY LAYER CHARACTERISTICS FOR HYPERSONIC FLOW WITH AND WITHOUT MASS ADDITION.
New York Univ N Y
For primary bibliographic entry see Field 20D.
AD-668 460 HC$3.00 MF$0.65

SOLUTIONS OF THE SECOND-ORDER BOUNDARY-LAYER EQUATIONS FOR LAMINAR INCOMPRESSIBLE FLOW,
Naval Ordnance Lab White Oak Md
For primary bibliographic entry see Field 20D.
AD-668 498 HC$3.00 MF$0.65

ASYMPTOTICS OF THE WAKE OF A BODY MOVING IN RAREFIED PLASMA,
Foreign Technology Div Wright-Patterson AFB Ohio
For primary bibliographic entry see Field 20I.
AD-668 505 HC$3.00 MF$0.65

VORTEX EFFECTS IN A TURBINE STAGE,
Foreign Technology Div Wright-Patterson AFB Ohio
For primary bibliographic entry see Field 21E.
AD-668 511 HC$3.00 MF$0.65

EVALUATION OF BOUNDARY LAYER AND WAKE SURVEY DATA REDUCTION TECHNIQUES IN COMPRESSIBLE FLOWS.
National Aeronautics and Space Administration. Langley Research Center, Langley Station, Va. K. R. Czarnecki, and R. B. Sorrells, III. Apr 68, 32p NASA-TN-D-4401
Contract 126-13-02-11-23

Descriptors: *Compressible flow, *Data reduction, *Turbulent boundary layer, *Turbulent wakes, Flow velocity, Mass flow, Skin friction, Theorem proving, Thickness.

For abstract, see STAR 06 10.
N68-19709 HC$3.00 MF$0.65

AN EXPERIMENT TO EXAMINE THE EFFECT OF POROUS TRAILING EDGES ON THE SOUND GENERATED BY BLADES IN AN AIRFLOW FINAL REPORT.
Wyle Labs., Inc., Huntsville, Ala.
R. C. Potter, Mar 68, 74p NASA-CR-66565, WR-68-6
Contract NAS1-6885

Descriptors: *Compressor blades, *Porous materials, *Sound fields, *Trailing edges, Aerodynamic noise, Air currents, Gas streams.

For abstract, see STAR 06 10.
N68-19791 HC$3.00 MF$0.65

AN INVESTIGATION OF EXTREMELY FLEXIBLE LIFTING ROTORS.
National Aeronautics and Space Administration. Langley Research Center, Langley Station, Va.
M. M. Winston. Apr 68, 28p NASA-TN-D-4465
Contract 721-01-00-28-23

Descriptors: *Aerodynamic stability, *Aeroelasticity, *Flexibility, *Lifting rotors, *Rotary wings, *Structural design, Aerodynamic coefficients, Camber, Lift, Lift devices, Rotor lift, Stiffness.

For abstract, see STAR 06 10.
N68-19954 HC$3.00 MF$0.65

APPROXIMATE RELATIONS FOR LAMINAR HEAT-TRANSFER AND SHEAR-STRESS FUNCTIONS IN EQUILIBRIUM DISSOCIATED AIR.
National Aeronautics and Space Administration. Langley Research Center, Langley Station, Va.
For primary bibliographic entry see Field 20M.
For abstract, see STAR 06 10.
N68-20065 HC$3.00 MF$0.65

ON THE ACOUSTIC THEORY OF SUPERSONIC FLOW PAST SLENDER BODIES OF REVOLUTION AT SMALL ANGLES OF ATTACK.
Zur Akustischen Theorie Schlanker Rotationskoerper in Angestellter Ueberschallstroemung
Deutsche Versuchsanstalt Fur Luft- Und Raumfahrt, Aachen (West Germany). Institut Fuer Theoretische Gasdynamik.
P. Niederdrenk. Jan 68, 24p DLR-FB-68-03, DVL-698
Lang- in German, English Summary

Descriptors: *Acoustic streaming, *Bodies of revolution, *Slender bodies, *Supersonic flow, Angle of attack, Bow waves, Conical bodies, Linear transformations, Mach cones, Potential flow.

For abstract, see STAR 06 10.
N68-20090 HC$3.00 MF$0.65

EXPERIMENTAL INVESTIGATIONS AND BOUNDARY LAYER THEORETICAL CALCULATIONS ON DECELERATING CASCADES AT COMPRESSIBLE FLOW, ESPECIALLY WHEN CHANGING THE RATIO OF AXIAL MASS FLOW DENSITY AND THE UPSTREAM INTENSITY OF TURBULENCE.
Experimentelle Und Grenzschichttheoretische Untersuchungen An Ebenen Verzoegerungsgittern Bei Kompressibler Stroemung, Insbesondere Bei Aenderung des Axialen Stromdichteverhaeltniss-Es Und Der Zustroemturbulenz
Deutsche Versuchsanstalt Fur Luft- Und Raumfahrt, Porz (West Germany). Institut Fuer Luftstrahlantriebe.
W. Heilmann. Dec 67, 153p DLR-FB-67-88, DVL-664
Lang- in German, English Summary

Descriptors: *Airfoil fences, *Boundary layer flow, *Compressible flow, *Mass flow rate, *Turbulent flow, Cascade flow, Flow velocity, Fluid dynamics, Laminar boundary layer, Turbulent boundary layer.

For abstract, see STAR 06 10.
N68-20091 HC$3.00 MF$0.65

ANALYTICAL INVESTIGATION OF SUPERSONIC TURBOMACHINERY BLADING. 2 - ANALYSIS OF IMPULSE TURBINE-BLADE SECTIONS.
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
For primary bibliographic entry see Field 21E.
For abstract, see STAR 06 10.
N68-20276 HC$3.00 MF$0.65

PERFORMANCE OF ANNULAR PLUG AND EXPANSION-DEFLECTION NOZZLES INCLUDING EXTERNAL FLOW EFFECTS AT TRANSONIC MACH NUMBERS.
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
R. A. Wasko. Apr 68, 33p NASA-TN-D-4462
Contract 128-31-11-03-22

Descriptors: *Annular nozzles, *Convergent-divergent nozzles, *Nozzle efficiency, *Plug nozzles, *Transonic nozzles, Mach number, Nozzle design, Nozzle flow, Nozzle geometry, Nozzle walls.

For abstract, see STAR 06 10.
N68-20330 HC$3.00 MF$0.65

CALCULATION OF SUBSONIC FLUTTER DERIVATIVES FOR AN ARROWHEAD WING WITH CONTROL SURFACES.
National Physical Lab., Teddington (England). Aerodynamics Div.
D. E. Lehrian. 1 May 67, 74p NPL-AERO-1230, ARC-29047

Descriptors: *Arrow wings, *Control surfaces, *Lifting bodies, *Subsonic flutter, Lift devices, Pitching moments, Steady flow, Subsonic flow, Surfaces, Torque.

For abstract, see STAR 06 10.
N68-20366 HC$3.00 MF$0.65

LARGE-SCALE WIND-TUNNEL INVESTIGATION OF AN AIRPLANE MODEL WITH A TILT WING OF ASPECT RATIO 8.4, AND FOUR PROPELLERS, IN THE PRESENCE OF A GROUND PLANE.
National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
W. H. Deckert, S. O. Dickinson, and V. R. Page. Apr 68, 80p NASA-TN-D-4493
Contract 721-01-00-01-00-21

Descriptors: *Aerodynamic characteristics, *Scale models, *Tilt wing aircraft, *V/stol aircraft, Graphs (charts), Ground effect, Leading edge slats, Trailing-edge flaps, Wind tunnel stability tests.

For abstract, see STAR 06 10.
N68-20370 HC$3.00 MF$0.65

CALCULATIONS SHOWING THE INFLUENCE OF AERODYNAMIC DAMPING ON BINARY WING FLUTTER.
National Physical Lab., Teddington (England). Aerodynamics Div.
N. C. Lambourne. 6 Jul 67, 24p NPL-AERO-1236, ARC-29264

Descriptors: *Flutter, *Incompressible flow, *Vibration damping, *Wing oscillations, Aerodynamic forces, Computation, Critical frequencies, Critical velocity, Equations of motion, Flexing, Rectangular wings, Torsion.

For abstract, see STAR 06 10.
N68-20394 HC$3.00 MF$0.65

SPURIOUS PRESSURE FLUCTUATIONS IN WIND TUNNELS.
National Physical Lab., Teddington (England). Aerodynamics Div.
For primary bibliographic entry see Field 14B.
For abstract, see STAR 06 10.
N68-20398 HC$3.00 MF$0.65

EXAMPLES OF NUMERICAL PRECISIONS IN THE RESOLUTION OF LINEAR SYSTEMS BY LEAST SQUARES METHOD.
Laboratoire de Recherches Balistiques Et Aerodynamiques, Vernon (France).
For primary bibliographic entry see Field 14B.
For abstract, see STAR 06 10.
N68-20473 HC$3.00 MF$0.65

A CALCULATION METHOD FOR THE INCOMPRESSIBLE TURBULENT BOUNDARY LAYER, INCLUDING THE EFFECT OF UPSTREAM HISTORY ON THE TURBULENT SHEAR STRESS.
National Physical Lab., Teddington (England). Aerodynamics Div.
For primary bibliographic entry see Field 20D.
For abstract, see STAR 06 10.
N68-20516 HC$3.00 MF$0.65

THE CHARACTERISTICS OF 78 RELATED AIRFOIL SECTIONS FROM TESTS IN THE VARIABLE-DENSITY WIND TUNNEL.
National Advisory Committee for Aeronautics, Washington, D. C.
For primary bibliographic entry see Field 1C.
PB-177 874 HC$3.00 MF$0.65

1B. Aeronautics

ARMY AIRCRAFT VOICE-WARNING SYSTEM STUDY.
Bunker-Ramo Corp Canoga Park Calif
For primary bibliographic entry see Field 1C.
AD-667 924 HC$3.00 MF$0.65

OPERATIONAL ANALYSIS OF TIME - FREQUENCY COLLISION AVOIDANCE SYSTEMS.
Boeing Co Renton Wash Commercial Airplane Div
Alex S. L. Nagy. 1968, 93p Rept no. D6-19535

Descriptors: (*Aviation accidents, *Early warning systems), Aviation safety, Frequency, Analysis, Digital computers, Mathematical models, Air traffic, Density, Threat evaluation, Evasion, Reaction kinetics, Simulation, Efficiency, Command + control systems, Programming (Computers), Display systems, Automatic, Flow charting.
Identifiers: Computer analysis, *Collision avoidance systems, Escape maneuvers.

The purpose of the work documented in this report was to develop a capability to evaluate collision avoidance systems (CAS) and to perform an operational analysis on a time-frequency collision avoidance system using this capability. Answers were sought for the following questions: (1) Given a certain threat geometry, how effective is the CAS in providing safe separation of the aircraft. (2) How do measurement errors degrade the performance of the CAS for a given encounter. (3) To what extent do alarms propagate vertically in high traffic density environments such as holding patterns. (Author)
AD-668 163 HC$3.00 MF$0.65

SCHEDULED AIR CARRIER FLIGHT ACTIVITY IN THE UNITED STATES, MAY 1967.
Interim rept.
Federal Aviation Administration Washington D C Office of Management Systems
Nov 67, 24p

Descriptors: (*Air traffic, Scheduling), (*Civil aviation, Statistical data), Commercial planes, Transport planes, United States, Flight, Jet transport planes, Helicopters, Tables.
Identifiers: Air taxi operations.

The report compares the scheduled flight activity of commercial air carriers in the United States during May 1967 with that of May 1965. Total scheduled air carrier flights for May 1967 increased 45

percent over the scheduled flights for May 1965. Jet air carrier service more than doubled with an increase of 223 percent, while the number of flights by turboprop aircraft increased by 195 percent. Flights by piston aircraft decreased during the same period by 21 percent. Air taxi and Instrastate scheduled service increased tremendously during the two-year period. A direct comparison (May 1967 with May 1965) by air carriers in this category of service is not feasible since some of those reporting in May 1965 have been dissolved or have assumed a new name, and many more have come into operation since May 1965. There were approximately 20 scheduled air carriers operating air taxi and intrastate service in May 1965, while 64 were listed in the May 1967 Official Airline Guide. Scheduled Friday flights increased from 347 in May 1965 to 1761 in May 1967. These 1761 flights represent 10.4 percent of all scheduled flights. Scheduled air carriers (excluding air taxi and intrastate) increased from 56 in May 1965 to 82 in May 1967. Of these, foreign air carriers accounted for 24 in May 1965 and 49 in May 1967. Of the 49 foreign carriers, 14 were Canadian based and 6 were based in Mexico. (Author)
AD-668 336 HC$3.00 MF$0.65

REVIEW OF CAUSES AND ALLEVIATION OF LOW TIRE TRACTION ON WET RUNWAYS.
National Aeronautics and Space Administration. Langley Research Center, Langley Station, Va.
W. B. Horne, G. R. Taylor, and T. J. Yager. Apr 68, 37p NASA-TN-D-4406
Contract 126-61-05-01-23

Descriptors: *Aircraft tires, *Hydroplaning, *Runways, *Skid landings, *Traction, Aircraft accidents, Landing gear, Landing loads, Rubber, Skidding, Wetting, Wheel brakes.

For abstract, see STAR 06 10.
N68-19620 HC$3.00 MF$0.65

1C. Aircraft

ARMY AIRCRAFT VOICE-WARNING SYSTEM STUDY.
Final rept. 10 Aug 67-10 Jan 68,
Bunker-Ramo Corp Canoga Park Calif
James E. Brown, Carmine M. Bertone, and Richard W. Obermayer. Feb 68, 230p Rept no. G0131-8U1
HEL-TM-6-68
Contract DAAD05-68-C-0025

Descriptors: (*Helicopters, Early warning systems), (*Short take-off planes, Early warning systems), (*Early warning systems, *Voice communication systems), Army aircraft, Observation planes, Pilots, Malfunctions, Cockpits, Aviation accidents, Human engineering, Statistical analysis, Display systems, Auditory signals, Instrument panels, Mission profiles, Job analysis, Questionnaires.
Identifiers: *Voice-warning systems, UH-1B aircraft, UH-1D aircraft, AH-1G aircraft, H-47 aircraft, CH-47 aircraft, H-54 aircraft, CH-54 aircraft, V-1 aircraft, OV-1 aircraft, H-1 aircraft.

The report describes an analytical study that was intended to serve as a basis for the application of voice-warning systems (VWS) for the UH-1B and UH-1D (Huey), AH-1G (Cobra), CH-47 (Chinook), CH-54 (Skycrane), and OV-1 (Mohawk). The following problems of installing a VWS in these Army aircraft were studied: (1) the identification and selection of messages for maximum effectiveness; (2) the determination of priority sequences; and (3) the integration of the VWS into existing cockpits. The study involved the collection of basic data and the conduct and validation of mission analyses, operational sequence diagrams, task analyses, aircraft configuration analyses, pilot opinion surveys, and Army aircraft accident analyses. In the report, priority sequences are derived for all major emergencies for the six vehicles; further analytical effort is described which reduced the list to 20 messages for inclusion in the VWS. For each aircraft, 2 lists of 20 messages are proposed; one list assumes additional sensors, while the second assumes the current sensor system. Recommendations are made for message structure and content, priority sequences, integration of the VWS with the current visual-warning system, general sensor requirements, interlocking between VWS messages, and other related considerations. (Author)
AD-667 924 HC$3.00 MF$0.65

FLUIDIC STALL SENSING SYSTEM,
Harry Diamond Labs Washington D C
Raymond W. Warren, and Elmer L. Swartz. Feb 68, 40p Rept no. HDL-TR-1368

Descriptors: (*Vertical take-off planes, Stall-warning indicators), (*Stall-warning indicators, *Fluid amplifiers), Short take-off planes, Flow separation, Angle of attack, Wings, Stalling, Lift, Boundary layer, Display systems, Fluidics, Probes, Sensors.
Identifiers: Blowing, Attached flow.

The fluid stall sensor is a remote indicating system for detecting stall on aircraft wings. When the flow is attached to the wing, it causes aspiration from a probe just above the wing surface. Separated flow, associated with stall, decreases the aspiration. The change in aspiration is amplified by a high impedance fluid amplifier which drives an indicator. The position of indicators from several probes across the wing gives an indication of the amount of lift remaining. (Author)
AD-667 936 HC$3.00 MF$0.65

TINTED WINDSCREENS IN U. S. ARMY AIRCRAFT,
Army Aeromedical Research Unit Fort Rucker Ala
John K. Crosley. Mar 68, 18p Rept no. USAARU-68-7

Descriptors: (*Helicopters, *Windshields), Colors, Vision, Adaptation (Physiology), Light transmission, Visibility, Pilots, Performance (Engineering), Human engineering, Aviation safety, Army aircraft.
Identifiers: AH-1G aircraft, H-1 aircraft.

A spectrophotometric analysis was performed on the tinted windscreen of the U. S. Army AH-1G helicopter. The results of this test, considered in conjunction with the conclusions of other researchers working with both aircraft and automobile tinted windshields, have led to the recommendation that no tinted media should be positioned between the pilot and his normal field of view during heavy overcast days, at twilight, or at night. (Author)
AD-667 960 HC$3.00 MF$0.65

A GENERAL METHOD FOR DETERMINING THE AERODYNAMIC CHARACTERISTICS OF FAN-IN-WING CONFIGURATIONS. VOLUME I. THEORY AND APPLICATION.
Final rept.,
Boeing Co Renton Wash Commercial Airplane Div
P. E. Rubbert, G. R. Saaris, M. B. Scholey, N. M. Standen, and R. E. Wallace. Dec 67, 298p
USAAVLABS-TR-67-61A-Vol-1
Contract DA-44-177-AMC-323 (T)
See also Volume 2, AD-667 981.

Descriptors: (*Vertical take-off planes, Aerodynamic characteristics), Ducted fans, Wing inlets, Incompressible flow, Lift, Short take-off planes, Aerodynamic configurations, Potential theory, Three-dimensional flow, Boundary layer, Jet mixing flow, Axially symmetric flow, Flow fields, Boundary value problems, Thrust vector control systems, Angle of attack, Yaw, Flight, Flaps, Computer programs.
Identifiers: Fan-in-wing configurations, *Lift fans, Streamlines.

A general method is presented for the determination of aerodynamic characteristics of fan-in-wing configurations by means of incompressible potential-flow theory. The method is applicable to wings, flapped or unflapped, and to a wide variety of other potential-flow boundary-value problems. Arbitrary wing and inlet geometry, fan inflow distribution, thrust vectoring, angle of attack, angle of yaw, and flight speeds from hover through transition can be treated. The theoretical model is completely three dimensional, with no linearization of boundary conditions. The calculated results include pressure distributions, lift, induced drag and side force, pitching moment, rolling moment and yawing moment. The numerical potential-flow solution is obtained with source and vortex distributions on the boundary surfaces. The representation is composed of small, constant-strength source sheet panels distributed over the exterior wing surfaces, internal vortex filaments which emanate from the wing trailing edge to provide circulation and to produce the trailing vortex sheet, and a vortex lattice across the fan face and along the periphery of the fan efflux. Source and vortex strengths are obtained by satisfying boundary conditions at discrete points on the boundary surfaces. Velocities and surface pressures are calculated from the induced effects of the source and vortex distributions. Internal fan loads, based on pressure and momentum relations across the fan and an assumed fan exit flow distribution, are added to integrated wing surface pressures to determine total forces and moments on a fan-in-wing configuration. The method was programmed for use with a high-speed digital computer. (Autho
AD-667 980 HC$3.00 MF$0.65

COMPARISON OF LONGITUDINAL STABILITY CHARACTERISTICS OF THREE TILT-WING VTOL AIRCRAFT DESIGNS,
Princeton Univ N J Dept of Aerospace and Mechanical Sciences
R. A. Curnutt, and H. C. Curtiss, Jr. Jan 68, 102p Rept no. 749
USAAVLABS-TR-66-64
Contract DA-44-177-AMC-8 (T)

Descriptors: (*Vertical take-off planes, Pitch (Motion)), (*Transport planes, Pitch (Motion)), Research planes, Convertible planes, Tilt wings, Stability, Design, Response, Model tests, Scale, Wind tunnel models, Airplane models, Analog computers, Aerodynamic characteristics, Correlation techniques.
Identifiers: C-142 aircraft, XC-142A aircraft, VZ-2 aircraft, Trim (Aircraft), Angle of incidence.

Experimental values of the longitudinal stability derivatives of three tilt-wing VTOL aircraft configurations as obtained from tests of several models are presented. Results from the NASA full-scale wind tunnel at Langley Field, the Princeton track, the LTV Aerospace Corporation wind tunnel and flight test are included. An analysis is included which utilizes root-locus and analog computer studies to compare the characteristic roots and transient response of the aircraft as the longitudinal derivatives are varied within the range exhibited by these data. Trim conditions at wing incidences from 20 to 90 degrees are considered. The three configurations included in the analysis were found to exhibit quite similar stability characteristics in the low-speed regime. Good correlation was found to exist between NASA wind tunnel data and Princeton Dynamic Model Track data for the VZ-2 aircraft. Consideration is given to the importance of various derivatives in determining the response characteristics. A large number of analog computer traces are included, showing variations in response characteristics caused by changes in individual derivatives. (Author)
AD-667 983 HC$3.00 MF$0.65

A STUDY OF THE VALIDITY OF GROUND-BASED SIMULATION TECHNIQUES FOR THE UH-1B HELICOPTER.
Technical rept. (Final),
Bell Helicopter Co Fort Worth Tex
John H. Emery, Walter G. O. Sonneborn, and Claude B. Elam. Dec 67. 83p Rept no. D299-099-350
USAAVLABS-TR-67-72
Contract DA-44-177-AMC-463 (T)

Descriptors: (*Helicopters, Flight simulators), (*Flight simulators, Effectiveness), Statistical functions, Experimental data, Pilots, Performance (Human), Efficiency, Simulation, Hovering, Center of gravity, Handling, Performance (Engineering), Correlation techniques.
Identifiers: H-1 aircraft, UH-1B aircraft.

The work explored the characteristics of some simulator and flight data which were collected in a UH-1B helicopter and a ground-based simulated version of the same. Analytical treatments are described and applied to these data. They are autocorrelation and cross correlation functions, pilot error and pilot efficiency. Results are reported on the effectiveness of certain simulator variables and performance measurement techniques. (Author)
AD-667 988 HC$3.00 MF$0.65

INVESTIGATIONS OF A VARIABLE AREA SCROLL FOR POWER TRANSFER IN TIP TURBINE LIFT FAN SYSTEMS.
General Electric Co Cincinnati Ohio Flight Propulsion Div
For primary bibliographic entry see Field 21E.
AD-667 989 HC$3.00 MF$0.65

THE STABILITY OF A WEDGE-SHAPED AIRFOIL IN A SUPERSONIC FLOW.
APL Library bulletin Translation Series,
Johns Hopkins Univ Silver Spring Md Applied Physics Lab
A. A. Izmailov. 15 Feb 68. 15p Rept no. APL-TG-230-T544
Contract NOw-62-0604
Trans. of Moscow Univ. Vestnik. Seriya 1: Matematika, Mekhanika (USSR), n1 p103-10 1967, tr. by A. I. Schidlovsky.

Descriptors: (*Supersonic airfoils, Stability), Wedges, Supersonic characteristics, Equations of motion, Differential equations, Supersonic flow, Boundary value problems, Series, USSR.
Identifiers: Translations, Bubnov-Galerkin method.

The paper considers the problem of stability of a plate in a supersonic flow. The plate has the form of a strip of infinite width in the plane. One edge is rigidly fixed and the other is free. The additional pressure exerted by the supersonic flow is given by A. A. Ilyushin's formula. The possibility of applying the small-parameter method for an approximate solution is discussed. The stagnation velocities are found by approximate solution in series and by the Bubnov-Galerkin method. A comparison of the results of the two methods shows a definite advantage of the latter. (Author)
AD-667 998 HC$3.00 MF$0.65

STUDY, SURVEY OF HELICOPTER AND V/STOL AIRCRAFT SIMULATOR TRAINER DYNAMIC RESPONSE. VOLUME I. DYNAMIC RESPONSE CRITERIA FOR ROTARY WING AIRCRAFT FLIGHT TRAINERS.
Final rept.,
Bell Aerosystems Co Buffalo N Y
H. G. Strieff. 1 Aug 66. 238p
NAVTRADEVCEN-1753-1
Contract N61339-1753
See also Volume 2, AD-668 006.

Descriptors: (*Helicopters, Flight simulators), (*Flight simulators, Standards), Vertical take-off planes, Performance (Engineering), Design, Handling, Training devices, Aerodynamic characteristics, Human engineering, Pilots, Transfer of training, Sensitivity, Equations of motion, Response, Rotary wings, Hovering.

The results of a study to determine the dynamic response criteria for helicopter simulator trainers are presented. The fundamentals of helicopter dynamics, control and simulation are described within the various helicopter flight regimes. Difficulties likely to be encountered in developing an adequate helicopter simulation are presented. Methods and procedures for determining the accuracy to which specific dynamic response parameters must be simulated are presented. Pilot sensitivities are developed for each significant handling qualities parameter in each flight regime. The dynamic attributes of the pilot-aircraft combination with regard to each specific parameter are discretely and comprehensively discussed. A detailed description of helicopter equation of motion, transfer functions and modes of motion are presented. The practical limitations of various methods and procedures for programming the equations of motion for piloted flight simulation purposes are discussed. (Author)
AD-668 005 HC$3.00 MF$0.65

STUDY, SURVEY OF HELICOPTER AND V/STOL AIRCRAFT SIMULATOR TRAINER DYNAMIC RESPONSE. VOLUME II. DYNAMIC RESPONSE CRITERIA FOR V/STOL AIRCRAFT FLIGHT TRAINERS.
Final rept.,
Bell Aerosystems Co Buffalo N Y
H. G. Streiff. May 67. 187p
NAVTRADEVCEN-1753-2
Contract N61339-1753
See also Volume 1, AD-668 005.

Descriptors: (*Vertical take-off planes, Flight simulators), (*Flight simulators, Standards), Short take-off planes, Helicopters, Performance (Engineering), Aerodynamic characteristics, Training devices, Design, Handling, Equations of motion, Pilots, Response, Computer programs, Flight control systems, Simulation.

The results of a study to determine the dynamic response criteria for V/STOL aircraft simulator trainers are presented. The fundamentals of V/STOL dynamics, control, and simulation within the various V/STOL flight regimes are described. Difficulties likely to be encountered in developing an adequate V/STOL aircraft simulation are also presented. Methods and procedures for determining the accuracy to which specific dynamic response parameters must be simulated are presented, and based upon these, simulation tolerances are developed for each significant handling qualities parameter in each flight regime. The dynamic attributes of the pilot-aircraft combination with regard to each specific parameter are discussed. A detailed description of various V/STOL aircraft equations of motion, transfer functions, and modes of motion is included and the practical limitations of various methods and procedures for programming the equations of motion for piloted flight simulation purposes are discussed. (Author)
AD-668 006 HC$3.00 MF$0.65

INTERCEPTION RADAR,
Foreign Technology Div Wright-Patterson AFB Ohio
For primary bibliographic entry see Field 19E.
AD-668 068 HC$3.00 MF$0.65

ON THE CALCULATION OF UNSTEADY NONLINEAR THREE-DIMENSIONAL SUPERSONIC FLOW PAST WINGS,
Stanford Univ Calif Dept of Aeronautics and Astronautics
J. J. Kacprzynski. Jan 68. 65p Rept no. SU-DAAR-339
AFOSR-68-0517
Contract F44620-67-C-0044

Descriptors: (*Swept-back wings, Supersonic characteristics), (*Delta wings, *Three-dimensional flow), Flow fields, Nonlinear systems, Leading edge, Thickness, Oscillation, Mathematical prediction, Angle of attack, Flutter, Lift, Accuracy, Aeroelasticity, Numerical analysis.
Identifiers: Unsteady flow, Streamlines.

A comprehensive study is made of factors influencing the accuracy of predicted thickness effects on the flow due to oscillatory motion of a sweptback wing in supersonic flight. For a delta planform with its leading edge swept at or near the Mach angle, the streamlines and velocity pattern due to thickness are found to be highly three-dimensional. Based on this observation, improvements are suggested to previous approximate second-order theories for the unsteady loading. Numerical examples are presented for 45 degree delta wings of 5% and 10% thicknesses, which indicate a substantial difference between the linearized and nonlinear lifting potential distributions. Although a greater volume of computation is needed to guarantee adequate accuracy, practical means are described for the complete numerical solution of problems of this type. (Author)
AD-668 069 HC$3.00 MF$0.65

AEROELASTIC STABILITY CHARACTERISTICS OF CYLINDRICAL SHELLS CONSIDERING IMPERFECTIONS AND EDGE CONSTRAINT,
Texas Univ Austin Dept of Aerospace Engineering
Gerald W. Barr, and Ronald O. Stearman. Jan 68. 37p
AFOSR-68-0382
Grant AF-AFOSR-1234-67

Descriptors: (*Supersonic airfoils, *Aeroelasticity), Supersonic characteristics, Structural shells, Cylindrical bodies, Stability, Flow fields, Defects (Materials), Deformation, Approximation (Mathematics), Aerodynamic loading, Equations of motion, Flutter.

Recent wind tunnel results indicate that the existing cylindrical shell aeroelastic stability theories are generally nonconservative. Therefore, some type of destabilizing mechanism is needed in the present theory to enhance correlation with experiment. In the paper, the dynamic stability behavior of thin circular cylindrical shells subjected to a supersonic flow field is investigated theoretically and compared with existing experimental data. Combined effects of axisymmetric initial geometric imperfections, radial edge constraint, and prestability deformations are considered. The cylinder's motion is described with nonlinear Donnell type shell equations coupled with a linear 'piston theory' aerodynamic approximation. A modal type approach employing Galerkin's approximate technique is used to investigate the dynamic stability about the shell's deformed middle surface. Prestability deformations alone have been shown to have very little influence on the aeroelastic stability behavior of very thin shells. However, with the inclusion of initial imperfections, the combined effect is destabilizing. The resulting aeroelastic stability boundaries correlate quite well with existing experimental data. (Author)
AD-668 074 HC$3.00 MF$0.65

THE DEVELOPMENT OF MODERN BOMBERS,
Foreign Technology Div Wright-Patterson AFB Ohio
Chien Kong. 30 Jun 67. 11p Rept no. FTD-HT-67-168
Edited trans. of Hang K'ung Chih Shih (Chinese People's Republic), n6 p8-10 1965.

Descriptors: (*Jet bombers, Reviews), Strategic weapons, Attack bombers, Ranges (Distance), Velocity, Payload, Performance (Engineering), Guided missiles, Supersonic planes, Nuclear bombs, Configuration, Turbojet engines, Afterburners, Center of gravity, Flight crews, China.
Identifiers: Translations.

A brief general description is given of bombers. Three kinds of bombers are noted: (1) The heavy or long-range strategic bomber, loaded weight 100 - 200 tons, maximum flying range 7000 km, weapon carrying capacity over 10 tons including atom-

ic bombs and missiles, which is chiefly used for attacking military bases, political, economic, and strategic points. (2) The medium-range strategic bomber, loaded weight 40 - 90 tons, maximum flying range 4000 - 6500 km, weapon carrying capacity over 5 tons, also including atomic bombs and missiles, which is most commonly used for attacking strategic points. (3) The lightweight or tactical bomber, loaded weight 15 - 30 tons, maximum flying range about 3000 km, weapon carrying capacity 3 - 4 tons including small atomic bombs, which is used in the front lines, and for attacking the supply lines and military personnel. It is noted that, under the present conditions, when radar and missiles are used widely in air defense, the trend of bomber development is both toward higher altitudes and greater speed, and lower altitudes and greater speed.
AD-668 101 HC$3.00 MF$0.65

SUPERSONIC FLOW PAST BODIES OF ROTATION WITH ANNULAR GAP,
Foreign Technology Div Wright-Patterson AFB Ohio
M. G. Morozov, and Yu. V. Baryshev. 17 Aug 67, 11p Rept no. FTD-MT-24-163-67
Edited machine trans. of Moscow Univ. Vestnik. Seriya I: Matematika, Mekhanika (USSR) n6 p108-13 1966. Another trans. is available as AD-663 077.

Descriptors: (*Laminar flow, Supersonic characteristics), Stagnation point, Bodies of revolution, Wind tunnel models, Model tests, Drag, Cylindrical bodies, Conical bodies, USSR.
Identifiers: Translations.

The results of an experimental investigation of supersonic flows past bodies of revolution with annular recesses of various lengths by means of a wind tunnel in the Mach ranges M = 1.79 to 3.69 and Re = 290,000 to 1,050,000 for 1 cm are presented. Various cylindrical models 6 to 60 mm in diameter with conical forward sections and with annular recesses of different lengths and depths were considered. The length of the recess l sub cr called critical for which the flows changed from flows with one to flows with two stagnation regions and also its ratio to its depth were determined experimentally from schlieren photographs. An attempt was made to establish the relationship between l sub cr/h and M and Re. The results of measurements on aerodynamic drag confirmed the conclusions from an analysis of the available data stating that the transition from the first to the second type of flow is accompanied by a jump-type increase in drag, thus an increase in the diameter of the rear cylinder in the region l sub cr may lead to a decrease in drag, and vice versa. The transition from the first type of flow to the second occurs in a quite narrow range of the value K1 sub cr/L = 12 to 22, where k is the coefficient accounting for the curvature of the model. (Author)
AD-668 103 HC$3.00 MF$0.65

STABILITY OF A THREE-LAYER ORTHOTROPIC PLATE IN A SUPERSONIC GAS FLOW,
Foreign Technology Div Wright-Patterson AFB Ohio
Zh. E. Bagdasaryan. 29 Aug 67, 18p Rept no. FTD-HT-66-764
Unedited rough draft trans. of Akademiya Nauk Armyanskoi SSR, Erevan. Izvestiya. Fiziko-Matematicheskie, Estestvennye i Tekhnicheskie Nauki, v14 n5 p21-30 1961, tr. by E. Harter.

Descriptors: (*Supersonic airfoils, Flutter), Stability, Supersonic characteristics, Gas flow, Rectangular bodies, Angle of attack, Thickness, Differential equations, USSR.
Identifiers: Plates (Mechanical), Translations.

The report attempts to solve the problem of nonlinear flutter of three-layer rectangular plates, streamlined by a supersonic gas stream with a zero angle of attack. The layers are symmetrical w.r. to the neutral plane and the materials obey a generalized Hook's law. Normal displacements were assumed to be comparable with the thickness of the plate. A system non-linear differential equations was given together with the expression for a transverse load, and boundary conditions. An approximate solution was assumed to be trigonometric and, on substitution, the original equations were shown to reduce to a non-linear system of two equations in dimensionless variables, for the case of one-sided streamlining with different stream velocities. The periodic solution near the critical value was sought by the method of successive approximations and the amplitude and frequency of established flutter vibrations were found by the Bubnov-Galerkin method. The amplitude of second approximation was also obtained. Two possible cases were discussed and a numerical example was given. The conclusions reached were that critical flutter velocity found by the above method is significantly smaller than that found from the classical theory, and that the difference between two values increases with the value of h1/a, where h1 is thickness of the plate and a is length of the plate.
AD-668 121 HC$3.00 MF$0.65

AIRCREW COOLING STUDY.
Johns Hopkins Univ Silver Spring Md Applied Physics Lab
For primary bibliographic entry see Field 6Q.
AD-668 139 HC$3.00 MF$0.65

MOTIONS OF A FLOAT-SUPPORTED AIRCRAFT IN A SEAWAY.
Technical rept.,
Hydronautics Inc Laurel Md
R. A. Barr, R. R. Altmann, and K. K. Wong. Sep 67, 122p Rept no. TR-513-3
Contract Nonr-4769 (00)

Descriptors: (*Seaplanes, Seaplane floats), (*Seaplane floats, Hydrodynamics), Equations of motion, Ocean waves, Model tests, Hydrodynamic configurations, Cylindrical bodies, Taper, Response, Force (Mechanics), Buoyancy, Scale, Pitch (Motion), Roll.
Identifiers: A-2 aircraft, *Hydrodynamic characteristics.

An experimental investigation of three vertical float configurations was carried out and the results compared with theoretical predictions of the motions. The models considered correspond to: The A2 aircraft configuration considered by Wong in head seas; the A2 configuration in beam seas; and a configuration identical with the A2 configuration in beam seas but having tapered or flared floats. It was thus possible to compare the response for three configurations each having significantly different responses. Calculations of the heave, pitch (roll) and surge (sway) response were made using the non-linear methods developed by Barr and Martin. The measured heave and surge response are found to be in fairly good agreement with the theoretical predictions. The measured and predicted pitch (roll) responses are not in good agreement, although fair agreement was obtained for head seas by a modification of the estimated plate drag coefficient. For both roll and heave, the measured response was greater with tapered than with cylindrical floats. Further experimental investigation of float and damping plate forces and non-linear effects are needed to obtain improved predictions of response, particularly for pitch (roll). (Author)
AD-668 171 HC$3.00 MF$0.65

CALCULATION OF PLANE AND AXIALLY-SYMMETRICAL SUPERSONIC FLOWS IN THE PRESENCE OF IRREVERSIBLE PROCESSES,
Foreign Technology Div Wright-Patterson AFB Ohio
O. N. Katskova, and A. N. Kraiko. 10 Aug 67, 43p Rept no. FTD-MT-67-70
Edited machine trans. of mono. Osesimmetrichnykh Sverkhzvukovykh Techenii pri Nalichii Neobratimykh Protsessov, Moscow, 1964, p1-44.

Descriptors: (*Two-dimensional flow, Irreversible processes), Chemical reactions, Axially symmetric flow, Numerical analysis, Shifting equilibrium flow, Thermodynamics, Turbulence, Nozzle gas flow, Dissociation, USSR, Supersonic characteristics.
Identifiers: Method of characteristics, Translations.

Contents: Equations of characteristics; Equations of characteristics in finite-difference form and scheme of calculation; Calculation of axially symmetric nozzles; Examples of calculation.
AD-668 232 HC$3.00 MF$0.65

AVIATION TECHNOLOGICAL INSTITUTE. TRANSACTIONS: NO. 58, 1963,
Foreign Technology Div Wright-Patterson AFB Ohio
M. N. Galkin, E. S. Stebakov, L. L. Govseev, T. G. Tarasutin, and I. L. Pushkin. 6 Jun 67, 105p Rept no. FTD-MT-64-257
Edited machine trans. of Aviatsionnyi Tekhnologicheskii Institut, Moscow. Trudy (USSR), v58 p1-100 1963. The above journal is translated cover-to-cover. Report on Heat Exchange in Extrusion Casting.

Descriptors: (*Airframes, *Material forming), Structural parts, Extrusion, Casting, Thermal analysis, Heat transfer, Airplane panels, Alloys, Materials, Physical properties, Hydrodynamics, Thermodynamics, Crystallization, USSR.
Identifiers: Translations.

Contents: Extrusion casting of thin-walled parts; Thermal calculation of the crucible; Theory of extruding an alloy and forming a panel; and Thermophysical properties of materials.
AD-668 233 HC$3.00 MF$0.65

THE SHOCK AND VIBRATION BULLETIN.
Shock and Vibration Information Center (Defense) Washington D C
For primary bibliographic entry see Field 20K.
AD-668 246 HC$3.00 MF$0.65

THE POTENTIALS OF COMPOSITE STRUCTURES IN THE DESIGN OF AIRCRAFT.
Advisory Group for Aerospace Research and Development Paris (France)
1967, 73p Rept no. AGARD Advisory-10
NATO furnished.

Descriptors: (*Airframes, *Composite materials), Filaments, Reinforcing materials, Optimization, Aircraft, Wings, Design, Airborne, Loading (Mechanics), Laminates, Structural properties, Airplane panels, Fibers.

Contents: Some structural design aspects of filamentary composites; Applications and optimizations of structural composites for aircraft wings; Some design problems in introducing composite materials into airborne structures.
AD-668 253 HC$3.00 MF$0.65

THE SHOCK AND VIBRATION BULLETIN, PART VI.
Shock and Vibration Information Center (Defense) Washington D C
For primary bibliographic entry see Field 20K.
AD-668 328 HC$3.00 MF$0.65

A SURVEY OF THEORETICAL DYNAMIC ANALYSIS METHODS FOR AUTOMATIC FLIGHT CONTROL DESIGN.
Final rept.,
Michigan Univ Ann Arbor
Alfred C. Robinson. Oct 67, 198p
AFFDL-TR-67-147
Contract AF 33 (615)-1817

Descriptors: (*Flight control systems, Design), Mathematical analysis, Attitude control systems, Optimization, Theory, Reviews, Synthesis, Center of mass, Automatic, Airframes, Adaptive control systems, Linear systems, Nonlinear systems, Bibliographies.
Identifiers: Closed-loop control systems, Open-loop control systems.

The report is a survey of the theoretical methods in automatic control systems and their applications in the flight control field. A brief review of the 'classical' methods is given. Recent developments in 'modern' automatic control analysis applicable to flight control design and synthesis are emphasized. A bibliography of some of the pertinent articles and books is also included. (Author)
AD-668 472 HC$3.00 MF$0.65

VARIABLE STABILITY AIRCRAFT.
Avions A Stabilite Variable
National Aeronautics and Space Administration, Washington, D. C.
G. Klopfstein. Mar 68, 26p NASA-TT-F-11679, AGARD-537
Conf- Presented At the 28th Meeting of the Flight Mech. Group, Agard, Paris, 10-11 May 1966

Descriptors: *Aircraft design, *Computerized simulation, *Structural analysis, *Variable sweep wings, Aerodynamic configurations, Aerodynamic stability, France, Mirage 3 aircraft.

For abstract, see STAR 06 10.
N68-19750 HC$3.00 MF$0.65

JET NOISE AND SHEAR FLOW INSTABILITY SEEN FROM AN EXPERIMENTER'S VIEWPOINT.
Massachusetts Inst. of Tech., Cambridge.
For primary bibliographic entry see Field 20A.
For abstract, see STAR 06 10.
N68-20094 HC$3.00 MF$0.65

LUBRICANTS FOR INERTED LUBRICATION SYSTEMS IN ENGINES FOR ADVANCED AIRCRAFT.
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
R. L. Johnson, W. R. Loomis, and D. P. Townsend. 1968, 32p NASA-TM-X-52418
Conf- To Be Presented At Natl. Air Transportation Meeting, New York, 29 Apr. - 2 May 1968, Sponsored By the Soc. of Automotive Engr.

Descriptors: *Aircraft engines, *Friction, *Lubrication, Bearings, Failure, High temperature environments, High temperature tests, Lubricants, Seals (stoppers), Wear tests.

For abstract, see STAR 06 10.
N68-20210 HC$3.00 MF$0.65

PEPP BALLUTE DESIGN AND DEVELOPMENT FINAL REPORT.
Goodyear Aerospace Corp., Akron, Ohio. Martin Co., Denver, Colo.
22 Sep 67, 145p NASA-CR-66585, GER-13368
Contract NAS1-6703
Prep- Prepared for Martin Co.

Descriptors: *Aerodynamic characteristics, *Atmospheric entry, *Recovery parachutes, *Structural design, *Supersonic drag, Performance tests, Product development, Systems engineering, Temperature effects.

For abstract, see STAR 06 10.
N68-20314 HC$3.00 MF$0.65

FIFTY-FIVE FOOT DIAMETER RINGSAIL PARACHUTE. PLANETARY ENTRY PARACHUTE PROGRAM FINAL TECHNICAL REPORT.
Pioneer Parachute Co., Inc., Manchester, Conn.
F. J. Stone. Dec 67, 84p NASA-CR-66588, E-0082-RT/1
Contract NAS1-6703
Prep- Prepared for Martin Co.

Descriptors: *Atmospheric entry, *Construction materials, *Mechanical properties, *Recovery parachutes, *Ring structures, *Structural design, Performance tests, Shock loads, Stress analysis.

For abstract, see STAR 06 10.
N68-20315 HC$3.00 MF$0.65

DGB 40 FT PARACHUTE FINAL REPORT.
Martin Co., Denver, Colo. Schjeldahl (G. T.) Co., Northfield, Minn.
R. Lemke. 13 Oct 67, 73p NASA-CR-66587, PR25-36-SPED-1
Contract NAS1-6703
Prep- Prepared for Martin Co.

Descriptors: *Atmospheric entry, *Disks (shapes), *Performance tests, *Recovery parachutes, *Stress analysis, *Structural design, Construction materials, Mechanical properties, Ring structures, Supersonic drag.

For abstract, see STAR 06 10.
N68-20316 HC$3.00 MF$0.65

FORTY FT-DIAMETER RINGSAIL PARACHUTE PLANETARY ENTRY PARACHUTE PROGRAM FINAL TECHNICAL REPORT.
Martin Co., Denver, Colo. Pioneer Parachute Co., Inc., Manchester, Conn.
F. J. Stone. 1967, 95p NASA-CR-66586, E-0067-RT/2
Contract NAS1-6703
Prep- Prepared for Martin Co.

Descriptors: *Atmospheric entry, *Construction materials, *Mechanical properties, *Recovery parachutes, *Ring structures, *Structural design, Numerical analysis, Parachute fabrics, Shock loads, Systems engineering.

For abstract, see STAR 06 10.
N68-20317 HC$3.00 MF$0.65

SIXTY FOOT DIAMETER DGB PARACHUTE PLANETARY ENTRY PARACHUTE PROGRAM DESIGN REPORT.
Martin Co., Denver, Colo. Schjeldahl (G. T.) Co., Northfield, Minn.
R. A. Lemke, R. D. Moroney, T. J. Neuhaus, and R. J. Niccum. 14 Jul 67, 77p NASA-CR-66589
Contract NAS1-6703
Prep- Prepared for Martin Co.

Descriptors: *Atmospheric entry, *Mechanical properties, *Recovery parachutes, *Ring structures, *Structural design, Construction materials, Disks (shapes), Gaps, Parachute fabrics, Performance tests, Structural members, Systems engineering.

For abstract, see STAR 06 10.
N68-20319 HC$3.00 MF$0.65

PLANETARY ENTRY PARACHUTE PROGRAM.
Martin Co., Denver, Colo. Raven Industries, Inc., Sioux Falls, S. Dak.
E. W. Boettcher. 1967, 164p NASA-CR-66590, R-1767
Contract NAS1-6703
Prep- Prepared for Martin Co.

Descriptors: *Atmospheric entry, *Parachute fabrics, *Recovery parachutes, *Stress analysis, *Structural design, Construction materials, Mechanical properties, Shock loads, Systems engineering.

For abstract, see STAR 06 10.
N68-20320 HC$3.00 MF$0.65

THE CHARACTERISTICS OF 78 RELATED AIRFOIL SECTIONS FROM TESTS IN THE VARIABLE-DENSITY WIND TUNNEL.
National Advisory Committee for Aeronautics, Washington, D. C.
Eastman N. Jacobs, Kenneth E. Ward, and Robert M. Pinkerton. Nov 33, 58p Rept. no. 460

Descriptors: (*Airfoils, Aerodynamic characteristics), Wind tunnel models, Model tests, Reynolds number, Thickness, Aspect ratio, Aerodynamic configurations, Trailing edge.
Identifiers: Graphs (Charts).

An investigation of a large group of related airfoils was made in the N.A.C.A. variable-density wind tunnel at a large value of the Reynolds Number. The tests were made to provide data that may be directly employed for a rational choice of the most suitable airfoil section for a given application. The variation of the aerodynamic characteristics with variations in thickness and mean-line form were therefore systematically studied. The related airfoil profiles for this investigation were developed by combining certain profile thickness forms, obtained by varying the maximum thickness of a basic distribution, with certain mean lines, obtained by varying the length and the position of the maximum mean-line ordinate. A number of values of these shape variables were used to derive a family of airfoils. For the purposes of this investigation the construction and tests were limited to 68 airfoils of this family. In addition to these, several supplementary airfoils have been included in order to study the effects of certain other changes in the form of the mean line and in the thickness distribution. The results are presented in the standard graphic form representing the airfoil characteristics for infinite aspect ratio and for aspect ratio 6. A table is also given by means of which the important characteristics of all the airfoils may be conveniently compared. The variation of the aerodynamic characteristics with changes in shape is shown by additional curves and tables. A comparison is made, where possible, with thin-airfoil theory, a summary of which is presented. (Author)
PB-177 874 HC$3.00 MF$0.65

1D. Aircraft Flight Control and Instrumentation

FLUIDIC STALL SENSING SYSTEM.
Harry Diamond Labs Washington D C
For primary bibliographic entry see Field 1C.
AD-667 936 HC$3.00 MF$0.65

A SURVEY OF THEORETICAL DYNAMIC ANALYSIS METHODS FOR AUTOMATIC FLIGHT CONTROL DESIGN.
Michigan Univ Ann Arbor
For primary bibliographic entry see Field 1C.
AD-668 472 HC$3.00 MF$0.65

DETERMINATION AND STABILIZATION OF THE ALTITUDE OF AN AIRCRAFT IN SPACE USING SEMI-CONDUCTOR DETECTORS.
Determination Et Stabilisation de l'Altitude D'un Aeronef Par Detecteur A Semiconducteur
Commissariat A L Energie Atomique, Grenoble (France). Centre D Etudes Nucleaires.
L. Gilly. Nov 67, 48p CEA-R-3281
Coll- 48 P Refs Lang- in French, English Summary

Descriptors: *Aircraft control, *Altimeters, *Flight instruments, *Semiconductor devices, *Stabilizers (fluid dynamics), Aircraft stability, Alpha particles, Altitude control, Americium 241, Flight altitude, Radiation detectors, Uranium 235.

For abstract, see STAR 06 10.
N68-20527 HC$3.00 MF$0.65

2. AGRICULTURE

2A. Agricultural Chemistry

CBE FACTORS MONTHLY SURVEY NO. 24.
Library of Congress Washington D C Aerospace Technology Div
For primary bibliographic entry see Field 15B.
AD-668 075 HC$3.00 MF$0.65

2C. Agricultural Engineering

THE ENERGY BUDGET AT THE EARTH'S SURFACE: A STUDY OF THE CARBON DIOXIDE CONCENTRATION MONITORED OVER AN AGRICULTURAL FIELD NEAR ITHACA, N. Y.
Agricultural Research Service Ithaca N Y Soil and Water Conservation Research Div
For primary bibliographic entry see Field 4B.
AD-667 996 HC$3.00 MF$0.65

GENERAL DEVELOPMENT PLAN MID-AMERICA INDUSTRIAL DISTRICT PRYOR, OKLAHOMA. VOLUME 2. APPENDIX.
Hudgins, Thompson, Ball and Associates, Inc., Oklahoma City, Okla.
For primary bibliographic entry see Field 5I.
PB-177 886 HC$3.00 MF$0.65

2F. Forestry

A LABORATORY STUDY ON THE DRAG FORCE DISTRIBUTION WITHIN MODEL FOREST CANOPIES IN TURBULENT SHEAR FLOW,
Colorado State Univ Fort Collins Fluid Mechanics Program
For primary bibliographic entry see Field 20D.
AD-668 255 HC$3.00 MF$0.65

DYNAMIC PROPERTIES OF SMALL, CLEAR SPECIMENS OF STRUCTURAL-GRADE TIMBER.
Naval Civil Engineering Lab Port Hueneme Calif
For primary bibliographic entry see Field 11L.
AD-668 487 HC$3.00 MF$0.65

HISTORY AND ACTIVITIES OF THE MORDOVSKII GAME AND FOREST PRESERVE,
Joint Publications Research Service, Washington, D. C.
I. M. Oliger, and Ya. Tsinger. 11 Jan 68. 11p
Trans. of Zapovedniki SSSR (sic) v1 p193-200 n.d. and mono. Geograficheskii Kalender na 1961 g. n.p., Mar 60 p64.

Descriptors: (*Forestry, USSR), (*Natural resources, USSR), Plants (Botany), Animals, Soils, Ecology, Climatology.
Identifiers: Mordovskiy preserve (USSR).

Contents: The Mordovskiy preserve imeni P. G. Smidovich; and The Mordovskiy preserve.
JPRS-43988 HC$3.00 MF$0.65

BUILDUP INDEX AS AN EXPRESSION OF MOISTURE CONTENT IN DUFF.
Forest Service Research note,
North Central Forest Experiment Station, St. Paul, Minn.
Von J. Johnson. 1968. 4p FSRN-NC-43
Prepared in cooperation with Minnesota Univ.

Descriptors: (*Forestry, Moisture), (*Moisture, *Fire safety), Weather, Recording systems, Hygrometers, Plants (Botany), Graphics, Debris, Forest fires, Scientific research.
Identifiers: BUI (Buildup Index), Moisture content.

The relation between Buildup Index and moisture content of grouped litter and duff samples from beneath four medium-site forest stands closely approximated the relation between Buildup Index and moisture equivalent of 5-day timelag fuels having an equilibrium moisture content of 15 percent. (Author)
PB-178 013 HC$3.00 MF$0.65

TIMBER MANAGEMENT GUIDE FOR SHORTLEAF PINE AND OAK-PINE TYPES IN MISSOURI.
Research paper,
North Central Forest Experiment Station, St. Paul, Minn.
K. A. Brinkman, and N. F. Rogers. Nov 67. 19p FSRP-NC-19

Descriptors: (*Forestry, Economics), Trees, Reforestation, Reclamation, Soils, Soil mechanics, Herbicides, Forest fires, Pest control, Insects, Missouri.
Identifiers: Silviculture, Shortleaf pine, Oakpine.

The management practices recommended here for the shortleaf pine and oak-pine types in Missouri are based on published information, research in progress, and the knowledge and experience of forest managers. The guides provide a basis for decision making, and their use will improve continuity in the management of these important forest types.
PB-178 014 HC$3.00 MF$0.65

AN EXPERIMENT ON INHIBITING SCHIZOPHYLLUM COMMUNE Fr. DEVELOPMENT BY ANTAGONISM,
National Science Foundation, Washington, D. C.Special Foreign Currency Science Information Program.
For primary bibliographic entry see Field 6M.
TT-67-58010 HC$3.00 MF$0.65

PRODUCING SEEDLINGS FROM UNRIPE FOREST SEED,
National Science Foundation, Washington, D. C. Special Foreign Currency Science Information Program.
Ivan Soljanik. 1968. 13p SFCSI-Agr (TT-67-58012)
Trans. of Sumarstvo (Yugoslavia) v14 n5/6 p161-7 1961, tr. by Mihailo Markovic.

Descriptors: (*Forestry, Seeds), Selection, Plants (Botany), Germination, Processing, Production, Aging (Materials).

The slow germination of some forest tree species, which lie dormant for a year or more after sowing, has been explained in forestry literature by the fact that physiological ripeness occurs much later than morphological ripeness of the fruit, so that the seed may be capable of sprouting only following physiological after ripening, i.e., after complete drying. According to the said views, in the course of physiological afterripening some special biochemical) processes take place in the kernel which influence the ability of the seed to germinate, which is not yet sufficiently explored. Recent investigations in this domain (Von Weche and Stankovic in Switzerland in 1937) have shown that such views are subject to criticism, because the dormant seed, and the stone fruits as well, may germinate in a shorter time under suitable conditions. (Author)
TT-67-58012 HC$3.00 MF$0.65

3. ASTRONOMY AND ASTROPHYSICS

3A. Astronomy

INVESTIGATIONS ON NEBULAR VARIABLES AND FLARE STARS.
Final rept. 1 Oct 61-31 Dec 62,
Osservatorio Astrofisico Asiago (Italy)
L. Rosino. 31 Jan 63. 19p
Grant AF-EOAR-62-32

Descriptors: (*Astronomical observatories, *Nebulae), (*Variable stars, Astronomical observatories), Telescopes, Astronomical cameras, Intensity, Photographic techniques, Brightness, Luminescence, Optical properties, Radio astronomy, Italy.

The researches on nebular variables and flare stars sponsored by the European Office of aerospace Research under Grant AF-EOAR 62 - 32 have been made, at the Astrophysical Observatory of Asiago of the University of Padova, in the period 1 October 1961 through 31 December 1962 with two different telescopes: the parabolic telescope of 122 cm. F:5 and the Schmidt telescope of 50-40 cm.F:2.5. The large telescope was used for investigations on faint objects, particularly on nebular variables weaker than magnitude 16 pg, and for the discovery of sudden flares of faint stars with the technique of the multiple exposures. (Author)
AD-668 212 HC$3.00 MF$0.65

ON THE QUESTION OF POLYGONALITY AND IRREGULARITIES OF THE SHAPE OF CERTAIN CRATERS ON THE MOON.
K Voprosu O Poligonal'nosti I Nepravil'nostyakh Formy Nekotorykh Kraterov Na Lune
Volt Technical Corp., Washington, D. C.
V. D. Davydov. 25 Mar 68. 5p NASA-CR-93660, ST-LPS-LS-10697
Contract NAS5-12487
Tran- Transl. Into English From Dokl. Akad. Nauk Sssr, Ser. Astron., V. 178, No. 4, 1968 P 797-799

Descriptors: *Lunar craters, *Lunar topography, *Structural analysis, Celestial bodies, Lunar photographs, Moon, Polygons, Shapes.

For abstract, see STAR 06 10.
N68-19559 HC$3.00 MF$0.65

ULTRAVIOLET DAYGLOW AND STELLAR BRIGHTNESS MEASUREMENT FROM THE X-15 AIRCRAFT.
Wisconsin Univ., Madison.
L. R. Doherty. Mar 68. 22p NASA-CR-1017
Grant NSG-618
Coll- 22 P Refs

Descriptors: *Astronomical photography, *Cameras, *Stellar luminosity, *X- 15 aircraft, Astrophysics, Brightness, Photometers, Spectrometers, Ultraviolet radiation.

For abstract, see STAR 06 10.
N68-19590 HC$3.00 MF$0.65

ICE CAPS ON VENUS (QUES).
California Univ., Los Angeles. Dept. of Chemistry.
W. F. Libby. 1967. 6p NASA-CR-93741
Grant NSG-237-62, Contract AF-AFOSR-245-67

Descriptors: *Ice, *Polar caps, *Venus (planet), Carbon dioxide, Mariner space probes, Venus atmosphere, Venus probes, Water.

For abstract, see STAR 06 10.
N68-19846 HC$3.00 MF$0.65

PHOTOGRAPHIC SEARCH FOR COMETS DURING 12 NOVEMBER 1966 SOLAR ECLIPSE FINAL REPORT.
Adelphi Univ., Garden City, N. Y.
H. C. Courten, and R. W. Genberg. Mar 68. 36p NASA-CR-93774
Contract NGR-33-001-016

Descriptors: *Comets, *Photographic measurement, *Solar eclipses, Brazil, Stellar occultation.

For abstract, see STAR 06 10.
N68-20010 HC$3.00 MF$0.65

3B. Astrophysics

RADIO 70 YEARS: COLLECTION ARTICLES.
Foreign Technology Div Wright-Patterson AFB Ohio
For primary bibliographic entry see Field 17B.
AD-667 925 HC$3.00 MF$0.65

CATALOGUE OF PARAMETERS OF POLARIZED LIGHT REFLECTED BY TERRESTRIAL ROCKS,
Foreign Technology Div Wright-Patterson AFB Ohio
E. K. Kokhan. 29 Jun 67, 25p Rept no. FTD-HT-67-172
Edited trans. of Astronomicheskaya Observatoriya, Pulkovo. Izvestiya (USSR) v23 n5 p93-106 1964.

Descriptors: (*Lunar environment, *Light transmission), Polarization, Light, Reflection, Quartz, Rock (Geology), Igneous rock, Models (Simulations), Measurement, Curve fitting, Sampling, Grain size, USSR.
Identifiers: Translations, Polarimeters, Angle of reflection.

The author summarizes the history of studies on reflected polarized light from solid bodies. His objective in the present investigation is measurement in natural rock material of changes in degree of polarization of reflected light (of various wavelengths) depending on the phase angle. Curves were obtained for angular changes in the polarization plane and the results were compared with curves for the lunar surface. An effort was made to obtain specimens corresponding as nearly as possible to lunar types. Twelve specimens were studied (obsidian, vesicular andesite, basalt, gneissic granite, biotite granite, quartz, prismatic quartz, ocherous limonite, two varieties of tuff, and scoria) in the uncrushed state and in crushed form. Grain size of the rocks was selected on conclusions concerning probable microrelief on the moon. The studies were made in the Planetary Laboratory of Leningrad State University, using the polarimeter of the Pulkovo Observatory. This polarimeter was attached to the indicating device (indicatometer) of the University. The model for the experiment was set up with a lamp to represent the sun, the specimen to represent the moon, and the polarimeter to represent the earth. All specimens were investigated with yellow and green Schott filters and without any filter. Measurements were made at various incident angles at two angles of reflection (0 and 45 degrees). The results are tabulated. (Author)
AD-668 051 HC$3.00 MF$0.65

SPECTROPHOTOMETRIC STANDARDS FOR THE 1962 TOTAL SOLAR ECLIPSE.
Instrumentation papers, no. 139,
Air Force Cambridge Research Labs L G Hanscom Field Mass
F. Q. Orrall. Feb 68, 35p Rept no. AFCRL-68-0057

Descriptors: (*Solar eclipses, Chromosphere), (*Chromosphere, Spectrophotometers), Sun, New Guinea, Spectrographic cameras, Photographic film, Catalogs, Standards.
Identifiers: Spectrograms.

This report contains the information needed to make spectrophotometric measurements on the numerous 'jumping-film' spectrograms obtained at the total solar eclipse of 4 and 5 February 1962 at Lae, New Guinea, by a joint expedition of the High Altitude Observatory, the National Bureau of Standards, and the Sacramento Peak Observatory (AFCRL). It includes a brief description of the instrument, a catalog describing each of the spectrograms, characteristic curves for the photographic emulsions used, and a procedure for reducing photometric measurements to absolute intensity. (Author)
AD-668 091 HC$3.00 MF$0.65

DIRECTED EMISSION MODEL FOR QUASARS,
Scientific Interim rept.,
University Coll Dublin (Ireland)
N. A. Porter. Apr 68, 12p
AFOSR-68-0791
Grant AF-EOAR-67-27
Availability: Published in Nature, v217 n5126 p329-31 Jan 1968.

Descriptors: (*Extraterrestrial radio waves, Sources), Cosmic rays, Magnetic fields, Galaxies, Line spectrum, Interstellar matter, Excitation, Polarization, Models (Simulations).
Identifiers: Quasars, Redshift.

The difficulties of accounting for the powerful emission of energy from quasars can be resolved if the emission is assumed to be concentrated in one direction. (Author)
AD-668 211 Not available from CFSTI.

INVESTIGATIONS ON NEBULAR VARIABLES AND FLARE STARS.
Osservatorio Astrofisico Asiago (Italy)
For primary bibliographic entry see Field 3A.
AD-668 212 HC$3.00 MF$0.65

SOME ADDITIONAL ASPECTS OF THE UNEQUAL ACTIVITY OF THE NORTHERN AND SOUTHERN SOLAR HEMISPHERES: MICROWAVE RADIO BURSTS AND SWFS.
Harvard Coll Observatory Cambridge Mass
Gladys A. Harvey, and Barbara Bell. 1968, 15p
Contract AF 19 (628)-3322
Pub as Smithsonian Contributions to Astrophysics, v10 n4 p197-208 1968.
Availability: Hard copy available from Superintendent of Documents, GPO, Washington, D. C. 20402, $0.20.

Descriptors: (*Solar flares, Extraterrestrial radio waves), Microwaves, Sunspots, Terrestrial magnetism, Magnetic storms, Distribution, Cosmic ray bursts, Solar systems, Ionospheric disturbances, Predictions, Intensity, Polar regions, Ice, Tables, Northern Hemisphere, Southern Hemisphere.

A study of the geomagnetic effects of major solar flares observed from 1937 through 1959, found that northern sunspot groups produced 62% of all observed major flares and a significantly larger proportion (86%) of those followed by a great geomagnetic storm. Subsequent investigations showed that the Northern Hemisphere of the sun has been the more frequent source of great storms for most of this century, while the Southern Hemisphere was the more frequent source in the latter half of the 19th century. Detailed study of several active-sun phenomena observed from 1957 through 1960 provided additional information on the unequal activity of the two solar hemispheres, but left unanswered certain questions of potential interest to those concerned either with forecasting solar activity and its terrestrial consequences or with theoretical understanding of active-sun phenomena. (Author)
AD-668 225 MF$0.65

ENERGY LOSS MECHANISMS OF PARTICLES IN SEMICONDUCTORS.
Holland Hitch Co Mich
For primary bibliographic entry see Field 18D.
AD-668 385 Not available from CFSTI.

QUANTUM THEORY OF GRAVITY. I. THE CANONICAL THEORY. II. THE MANIFESTLY COVARIANT THEORY. III. APPLICATIONS OF THE COVARIANT THEORY.
North Carolina Univ Chapel Hill Dept of Physics
For primary bibliographic entry see Field 20J.
AD-668 386 Not available from CFSTI.

ON THE WAVELENGTH DEPENDENCE OF THE BANDWIDTH AND THE DURATION OF TYPE I SOLAR RADIO BURSTS,
Oslo Univ (Norway) Inst of Theoretical Astrophysics
Oe. Elgaroey. 1967, 5p Rept nos. Scientific-7, Reprint-70
AFCRL-68-0204
Contract F61052-67-C-0070
See also AD-664 929.
Availability: Published in Astrophysical Letters, v1 p13-4 1967.

Descriptors: (*Solar disturbances, *Extraterrestrial radio waves), Bandwidth, Very high frequency, P band, Spectrum analyzers, Norway.

On 11 November 1966 storm bursts were recorded simultaneously between 145 and 165 Mc/s and between 315 and 335 Mc/s. From the records the bandwidth of the bursts, defined as the frequency span over which the burst could be discerned from the background continuum, was determined. Constructing histograms of the distribution of bursts of different bandwidths in the two observing ranges, a clear distinction between bursts occurring in the upper and the lower channel was found. In the lower frequency band most bursts had bandwidths between 2 and 6 Mc/s, whereas in the higher frequency band common bandwidths ranged between 4 and 12 Mc/s. The average bandwidths were 3.5 and 7.2 Mc/s respectively. Thus in the case under consideration a connection between observing frequency and burst bandwidth exists.
AD-668 390 Not available from CFSTI.

THE VELOCITY FIELD SURROUNDING SUNSPOTS, AS DERIVED FROM OBSERVATIONS OF H ALPHA,
Oslo Univ (Norway) Inst of Theoretical Astrophysics
E. Haugen. 1967, 7p Rept no. Scientific-4
AFCRL-68-0202
Contract F61052-67-C-0070
See also related report, AD-664 929.
Availability: Published in Solar Physics, v2 p227-30 1967.

Descriptors: (*Sunspots, Fluid dynamic properties), (*Solar atmosphere, Absorption spectrum), Spectroscopy, Hydrogen, Line spectrum, Models (Simulations), Doppler effect, Chromosphere, Norway.

During 1963-1967 several high-dispersion, H alpha-line spectra of sunspots and their surroundings have been obtained at the Oslo Solar Observatory. We have studied 2000 absorption elements found on these spectra. The absorption elements are usually found outside the spot; in 95% of the cases the whole element is situated outside the spot penumbra. Most of the elements are situated close to the penumbral rim, but elements are found out to five sunspot radii from the spot centre the results are discussed.
AD-668 398 Not available from CFSTI.

ON THE K-LINE OF CA II IN SUNSPOTS,
Oslo Univ (Norway) Inst of Theoretical Astrophysics
O. Engvold. 1967, 6p Rept no. Scientific-5
AFCRL-68-0203
Contract F61052-67-C-0070
See also AD-664 929.
Availability: Published in Solar Physics, v2 p234-6 1967.

Descriptors: (*Sunspots, Line spectrum), Absorption spectrum, Calcium, Photographic analysis, Doppler effect, Spectra (Visible + ultraviolet), Spectroscopy, Models (Simulations), Chromosphere, Norway.

According to Mustel and Tsap (1960) and Paciorek (1965) the K3 absorption line disappears in the centre of the sunspot umbrae. Bumba (1960), on the other hand, found that the K3 absorption is present in the umbrae. In order to discriminate

between the existing theories on the origin of the K-line emission it is important to know whether the K line is always doubly reversed, or if the sunspots make an exception. The problem was further investigated by examining K-line spectra obtained at the Oslo Solar Observatory during 1966. Results are given in the report.
AD-668 401 Not available from CFSTI.

ON THE K-LINE OF CaII IN SUNSPOTS,
Oslo Univ (Norway) Inst of Theoretical Astrophysics
Oddbjorn Engvold. 1967, 20p Rept no. Scientific-2
AFCRL-68-0201
Contract F61052-67-C-0070
See also related report, AD-664 929.
Availability: Published in Astrophysica Norvegica, v10 n9 p173-87 1967.

Descriptors: (*Sunspots, Line spectrum), Doppler effect, Chromosphere, Calcium, Magnetohydrodynamics, Solar spectrum, Absorption spectrum, Photographic analysis, Spectroscopy, Norway.

Sunspot spectra of the K-line of CaII have been investigated. The K3 absorption line is seen all through the umbrae, in contrast to earlier observers, with the exception of BUMBA (1960). It is pointed out that the detection of the K3 absorption line is rather sensitive to the use of a proper exposure time. The separation between the K2 emission peaks is found, also in sunspots, to increase with the distance from the centre of the solar disk. The Doppler widths (in velocity units) of the K232 emission profiles range from 9 km/sec to 13 km/sec for the umbrae as compared to 18-22 km/sec for the plages. The magnetic field strengths previously measured in sunspots, are not compatible with the high CaII ion velocities unless there exist strong magnetohydrodynamic wave fields in the chromosphere. (Author)
AD-668 402 Not available from CFSTI.

SIMULTANEOUS OBSERVATIONS OF H-ALPHA AND THE K-LINE OF Ca II IN THE SOLAR SPECTRUM,
Oslo Univ (Norway) Inst of Theoretical Astrophysics
Oddbjorn Engvold. 1967, 15p Rept no. Scientific-10
Contract F61052-67-C-0070
See also AD-664 929.

Descriptors: (*Solar spectrum, Measurement), Line spectrum, Calcium, Hydrogen, Photographic analysis, Spectrographic cameras, Sunspots, Spectra (Visible + ultraviolet), Norway.

A simple method for simultaneous observations of the K-line of CaII and the H alpha is described. It is shown that the same technique may easily be applied for other strong lines in the solar spectrum. (Author)
AD-668 403 HC$3.00 MF$0.65

A SOLAR MAGNETIC PATTERN EXTENDING FROM 40N to 35S.
Technical rept.,
California Univ Berkeley Space Sciences Lab
John M. Wilcox, and Robert Howard. 5 Apr 68, 13p Rept no. Series-9-Issue-19
Contract Nonr-3656 (26), Grant NSF-GA-1319
Research supported in part by NASA, grants NsG-243 and NGR-05-003-230.
Availability: To be published in Physical Review Letters.

Descriptors: (*Solar atmosphere, *Magnetic fields), Pattern recognition, Periodic variations, Sunspots, Area coverage, Correlation techniques, Solar disturbances.

During an interval of one year near the minimum of the 11 year sunspot cycle, an interpolated pattern of the interplanetary magnetic field has been compared with the photospheric magnetic field. This reveals a pattern in the solar field extending over a wide range of heliographic latitude on both sides of the equator. (Author)
AD-668 408 Not available from CFSTI.

MILLSTONE AND HAYSTACK SCIENTIFIC AND TECHNICAL PUBLICATIONS.
Massachusetts Inst of Tech Lexington Lincoln Lab
For primary bibliographic entry see Field 17I.
AD-668 435 HC$3.00 MF$0.65

A COMPARISON OF 3.3 mm BURSTS AND H-ALPHA EMISSION.
Rept. for Mar 66-Jun 67,
Aerospace Corp El Segundo Calif Lab Operations
Fred I. Shimabukuro. Mar 68, 20p Rept no. TR-0158 (3230-46)-11
SAMSO-TR-68-141
Contract F04695-67-C-0158

Descriptors: (*Solar flares, Extraterrestrial radio waves), (*Extraterrestrial radio waves, Millimeter waves), Alpha spectra, Emissivity, Burst, Optical phenomena, Correlation techniques, Protons, Chromosphere, Parabolic antennas, Measurement, Thermal radiation.
Identifiers: Proton flares.

Radio bursts observed at a wavelength of 3.3 mm are always associated with flares. The enhancement in the millimeter emission is strongly correlated with some optical event that is associated with the flare. Emissions in the bursts observed thus far, with the possible exception of those associated with proton flares, have not been large increases over quiescent readings and can be explained by a thermal mechanism. (Author)
AD-668 440 HC$3.00 MF$0.65

DESIGN STUDIES FOR 440-FOOT-DIAMETER RADIO AND RADAR TELESCOPE.
Massachusetts Inst of Tech Lexington Lincoln Lab
For primary bibliographic entry see Field 9E.
AD-668 474 HC$3.00 MF$0.65

ANALYSIS OF F AND G SUBDWARFS. 3 - AN ABUNDANCE ANALYSIS OF THE SUBDWARF MU CASSIOPEIA.
Smithsonian Astrophysical Observatory, Cambridge, Mass.
J. G. Cohen. Aug 67, 14p NASA-CR-93692, REPT.-706-7
Contract NGR-22-024-001

Descriptors: *Abundance, *Atmospheric models, *Cassiopeia constellation, *Dwarf stars, Chemical elements, Line spectra, Spectral line width, Spectrum analysis, Transition probabilities.

For abstract, see STAR 06 10.
N68-19495 HC$3.00 MF$0.65

ON THE COMPOSITION OF SIRIUS REVISITED.
Smithsonian Astrophysical Observatory, Cambridge, Mass.
O. Gingerich, K. M. Strom, and S. E. Strom. Feb 68, 6p NASA-CR-93693, REPT.-801-207
Contract NGR-22-024-001

Descriptors: *Astronomical models, *Atmospheric models, *Stellar structure, Celestial bodies, Spectrum analysis, Stars, Structural analysis.

For abstract, see STAR 06 10.
N68-19516 HC$3.00 MF$0.65

RAPID CONTRACTION OF A PROTOSTAR TO THE STAGE OF QUASI-HYDROSTATIC EQUILIBRIUM, I. THE CASE OF ONE SOLAR MASS WITHOUT RADIATION FLOW.
Kyoto Univ. (Japan). Research Inst. for Fundamental Physics.
C. Hayashi, T. Nakano, and N. Ohyama. Jan 68, 43p RIFP-66

Descriptors: *Contraction, *Protostars, *Stellar evolution, Energy dissipation, Hydrodynamic equations, Shock waves.

For abstract, see STAR 06 10.
N68-19573 HC$3.00 MF$0.65

SPATIAL NUCLEATION AND CRYSTAL GROWTH FINAL REPORT, 1 JUN. 1964 - 30 SEP. 1967.
Rensselaer Polytechnic Inst., Troy, N. Y. Materials Div.
J. B. Hudson. 1967, 12p NASA-CR-93724
Grant NSG-663

Descriptors: *Gas mixtures, *Interstellar matter, *Nucleation, Astrophysics, Cosmology, Granular materials, Graphite, Molecular beams, Particle size distribution, Spectrometers, Substrates, Theorem proving.

For abstract, see STAR 06 10.
N68-19639 HC$3.00 MF$0.65

ROTATIONS AND OSCILLATIONS OF A NEUTRON STAR.
Columbia Univ., New York.
W.-Y. Chau. 1967, 106p NASA-CR-93728
Grant NSG-445

Descriptors: *Neutron stars, *Oscillations, *Stellar rotation, Approximation, Calculus of variations, Gravitational fields, Polytropes.

For abstract, see STAR 06 10.
N68-19800 HC$3.00 MF$0.65

INTERPLANETARY ELECTRON CONTENT MEASURED BETWEEN EARTH AND THE PIONEER 6 AND 7 SPACECRAFT USING RADIO PROPAGATION EFFECTS.
Stanford Univ., Calif. Radioscience Lab.
R. L. Koehler. May 67, 124p NASA-CR-93777, SU-SEL-67-051
Contracts NSR-05-020-109, NAS2-3908

Descriptors: *Electron density profiles, *Interplanetary medium, *Propagation modes, *Radio transmission, Doppler effect, Ionosphere, Pioneer space probes, Plasma probes, Time dependence, Wave propagation.

For abstract, see STAR 06 10.
N68-19889 HC$3.00 MF$0.65

COMMENT ON THE BIOLOGICAL EFFECTS OF COSMIC RAYS FROM NEARBY SUPERNOVAE.
Maryland Univ., College Park. Dept. of Physics and Astronomy.
For primary bibliographic entry see Field 6R.
For abstract, see STAR 06 10.
N68-19937 HC$3.00 MF$0.65

ON SOME MAGNETOHYDRODYNAMIC EFFECTS IN COMETS.
Volt Technical Corp., Washington, D. C.
Z. M. Ioffe. 25 Mar 67, 6p NASA-CR-93797, ST-COM-MHD-10694
Contract NAS5-12487
Tran- Transl. Into English From Astron. Zh. (USSR), V. 44, No. 6, 1967 P 1304-1308

Descriptors: *Comets, *Magnetic fields, *Solar wind, Flow distribution, Magnetohydrodynamics, Shock waves, Velocity distribution.

For abstract, see STAR 06 10.
N68-20054 HC$3.00 MF$0.65

THEORETICAL STUDY OF THE MAGNETIC FIELD IN THE LUNAR WAKE.
National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
Y. C. Whang. Jan 68, 29p NASA-TM-X-63150, X-612-68-17

Descriptors: *Lunar magnetic fields, *Magnetic variations, *Maxwell equation, *Wakes, Electric fields, Interplanetary medium, Mathematical models, Numerical analysis, Shadows, Solar wind.

For abstract, see STAR 06 10.
N68-20085 HC$3.00 MF$0.65

DETERMINATION OF CHEMICAL COMPOSITION OF THE ATMOSPHERE OF VENUS BY THE INTERPLANETARY STATION " VENERA-4".
Opredeleniye Khimicheskogo Sos Tava Atmosfery Venery Mezhplanetnoy Stantsiyey Venera-4
Volt Technical Corp., Washington, D. C.
B. M. Andreychikov, K. P. Florenskiy, YU. A. Surkov, and A. P. Vinogradov. 9 Apr 68, 8p
NASA-CR-93815, ST-LPS-ACH-10699
Contract NAS5-12487
Tran- Transl. Into English From Dokl. Akad. Nauk Sssr, Ser. Astron. (Moscow), V. 179, No. 1, 1968 P 37-40

Descriptors: *Atmospheric composition, *Chemical reactions, *Venus atmosphere, Atmospheric chemistry, Atmospheric models, Carbon dioxide, Nitrogen, Venus (planet), Venus probes, Water.

For abstract, see STAR 06 10.
N68-20127 HC$3.00 MF$0.65

RESULTS OF THE EXPERIMENTS ON THE DETECTION OF LUNAR IONOSPHERE CONDUCTED ON THE FIRST ARTIFICIAL SATELLITE OF THE MOON.
Rezul'taty Eksperimentov Po Obnaruzheniyu Lunnoy Ionosfery Provedennykh Na Pervom Iskusstvennom Sputnike Luny
Volt Technical Corp., Washington, D. C.
V. V. Bezrukikh, K. I. Gringauz, M. Z. Khokhlov, L. S. Musatov, and A. P. Remizov. 1 Apr 68, 6p
NASA-CR-93793, ST-LPS-LA-10695
Contract NAS5-12487
Tran- Transl. Into English From Dokl. Akad. Nauk Sssr (Moscow), V. 170, No. 6, 1966 P 1306-1309

Descriptors: *Electron density (concentration), *Ion density (concentration), *Lunar atmospheres, Charged particles, Lunar satellites, Solar wind.

For abstract, see STAR 06 10.
N68-20175 HC$3.00 MF$0.65

RELATIVISTIC MODELS OF THE UNIVERSE WITH PRESSURE EQUAL TO ZERO AND TIME-DEPENDENT UNIFORMITY.
National Aeronautics and Space Administration. Langley Research Center, Langley Station, Va.
W. L. Sherman, and S. A. Wallace. Apr 68, 42p
NASA-TR-R-282
Contract 188-41-01-01-23

Descriptors: *Mathematical models, *Relativistic theory, *Universe, Approximation, Cosmology, Galaxies, Pressure distribution, Time dependence.

For abstract, see STAR 06 10.
N68-20192 HC$3.00 MF$0.65

SATELLITE AND ROCKET MEASUREMENTS OF CORPUSCULAR RADIATION FROM OUTER SPACE.
Mesures des Rayonnements Corpusculaires de l'Espace Au Moyen de Satellites Et de Fusees
European Space Research Organization, Paris (France).
Dec 67, 30p ESRO-SP-19
Conf- Eslab/Esrin Symp. Held in Noordwiuk, Netherlands, Jul. 1967

Descriptors: *Cosmic rays, *Radiation belts, *Rocket-borne instruments, *Solar flares, *Solar wind, Auroras, Corpuscular radiation, Cosmic plasma, Space probes.

For abstract, see STAR 06 10.
N68-20272 HC$3.00 MF$0.65

INFRARED OBSERVATIONS OF THE OUTER SOLAR CORONA.
Johns Hopkins Univ., Baltimore, Md.
R. M. Mac Queen. Apr 68 54p NASA-CR-969
Contract NGR-21-001-044
Coll- 54 P Refs

Descriptors: *Astronomical spectroscopy, *Infrared spectroscopy, *Solar corona, Astronomical telescopes, Coronagraphs, High altitude balloons, Infrared instruments, Solar eclipses, Stratosphere.

For abstract, see STAR 06 10.
N68-20353 HC$3.00 MF$0.65

STUDY OF 0,1 ME V GAMMA RADIATION IN THE EARTH'S ATMOSPHERE.
Etude Du Rayonnement Gamma Entre 0,1 Et 1 Mev Dans l'Atmosphere Terrestre
Commissariat A L Energie Atomique, Saclay (France). Centre D Etudes Nucleaires.
D. Boclet. 13 Jan 67, 87p CEA-R-3177
Lang- in French, English Summary

Descriptors: *Atmospheric radiation, *Extraterrestrial radiation, *Gamma rays, *Radiation detectors, Cerenkov radiation, Corpuscular radiation, Diffuse radiation, Electromagnetic radiation, Energy dissipation, Magnetic disturbances, Radiation sources, Scintillation counters.

For abstract, see STAR 06 10.
N68-20526 HC$3.00 MF$0.65

3C. Celestial Mechanics

THE EFFECT OF 3-DIMENSIONAL NONLINEAR RESONANCES ON THE MOTION OF A PARTICLE NEAR THE EARTH-MOON EQUILATERAL LIBRATION POINTS.
Stanford Univ., Calif. Dept. of Aeronautics and Astronautics.
H. B. Schechter. May 67, 119p NASA-CR-93769, SUDAAR-316
Grant NSG-133-61

Descriptors: *Earth-moon system, *Motion stability, *Particle motion, *Resonance, *Three body problem, Lateral stability, Librational motion, Points (mathematics), Position (location).

For abstract, see STAR 06 10.
N68-20119 HC$3.00 MF$0.65

A FAST METHOD OF ORBIT COMPUTATION.
National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
K. Stumpff, and E. H. Weiss. Apr 68, 41p NASA-TN-D-4470
Contract 311-02-01-01-51

Descriptors: *Artificial satellites, *Computer programs, *Ephemerides, *Orbit calculation, Mathematical models, Numerical analysis, Satellite orbits, Spacecraft trajectories, Trajectory analysis.

For abstract, see STAR 06 10.
N68-20356 HC$3.00 MF$0.65

4. ATMOSPHERIC SCIENCES

4A. Atmospheric Physics

GUN LAUNCHED PROBES - PARACHUTE EXPULSION TESTS UNDER SIMULATED ENVIRONMENT,
Atmospheric Sciences Lab White Sands Missile Range N Mex
L. Edwin Williamson. Feb 68, 31p
ECOM-5179

Descriptors: (*Atmospheric sounding, Sabot projectiles), (*Meteorological instruments, Gun launched), (*Sabot projectiles, *Parachutes), Packs (Parachute), High-speed cameras, Payload, Ejection, Meteorological parameters, Environmental tests, Simulation, Vacuum, Spheres, Reliability, Radiosondes, Materials, Damage, Photographs, New Mexico.
Identifiers: Gun probe project.

Experience gained during the early phases of Project Gun Probe at WSMR revealed evidence that the parachute packaging and/or expulsion techniques used at that time were unsatisfactory. Tests were planned to evaluate the technique visually, utilizing high-speed cameras and simulated environments. The 60-foot vacuum sphere at the NASA facility at Langley Research Center was made available, and six tests were successfully conducted. Results of the tests indicated that only minor modifications to the existing technique were necessary to produce a completely acceptable system. (Author)
AD-667 908 HC$3.00 MF$0.65

THE DIURNAL TIDE NEAR THE STRATOPAUSE OVER WHITE SANDS MISSILE RANGE, NEW MEXICO,
Atmospheric Sciences Lab White Sands Missile Range N Mex
For primary bibliographic entry see Field 4B.
AD-667 909 HC$3.00 MF$0.65

METEOROLOGICAL SHELL FOR STANDARD ARTILLERY PIECES: A FEASIBILITY STUDY,
Atmospheric Sciences Lab White Sands Missile Range N Mex
L. Edwin Williamson, and Bruce Kennedy. Oct 67, 113p
ECOM-5161

Descriptors: (*Atmospheric sounding, Sabot projectiles), (*Sabot projectiles, Feasibility studies), (*Meteorological instruments, Gun launched), Payload, Radar reflections, Wind, Radiosondes, Velocity, Radar reflectors, Altitude, Guns, Instrumentation, Tactical warfare, Telemeter systems, Sensors, Meteorological parameters, Atmospheric temperature, Humidity.
Identifiers: AN/UMQ-7 (V), Gun probe project.

A feasibility study has been performed which considered the applicability of an instrumented shell for a standard rifled gun as a means of obtaining meteorological data for tactical Army applications. The conclusions have shown that the technical feasibility of a meteorological shell is within the state-of-the-art of engineering practices. (Author)
AD-667 914 HC$3.00 MF$0.65

ROCKET MEASUREMENTS OF ATMOSPHERIC OZONE,
Atmospheric Sciences Lab White Sands Missile Range N Mex
Jagir S. Randhawa. Jan 68, 31p
ECOM-5169

Descriptors: (*Sounding rockets, Ozone), (*Atmospheric sounding, *Ozone), Radiosondes, Chemiluminescence, Detection, Stratosphere, Intensity, Oxygen, Detectors, Spectrometers, Distribution, Accuracy, Volume, Upper atmosphere.
Identifiers: *Ozonesondes.

The rocket-borne ozonesonde, which has been developed by the Atmospheric Sciences Laboratory, White Sands Missile Range, New Mexico, and utilizes the chemiluminescent principle for ozone detection, has been flown at Fort Greely, Alaska (64N) and White Sands Missile Range, New Mexico (32N) during different times in 1967. The data gathered from these soundings are presented. The ozone concentration found in the lower stratosphere agrees with data from balloon soundings, while in the upper stratosphere it is found to be five times greater than measured by spectrometric methods. (Author)
AD-667 919 HC$3.00 MF$0.65

PREDICTING DIFFUSION OF ATMOSPHERIC CONTAMINANTS BY CONSIDERATION OF TURBULENT CHARACTERISTICS OF WSMR,
Atmospheric Sciences Lab White Sands Missile Range N Mex
For primary bibliographic entry see Field 4B.
AD-667 920 HC$3.00 MF$0.65

METEOROLOGICAL REQUIREMENTS FOR THE AEROBEE - 350,
Atmospheric Sciences Lab White Sands Missile Range N Mex
Edward M. D'arcy. Jan 68, 24p
ECOM-5172

Descriptors: (*Sounding rockets, *Wind), Guided missile ranges, Exterior ballistics, Rocket trajectories, Thickness, Accuracy, Phototheodolites, Altitude, Radiosondes, Sensitivity, Upper atmosphere, Payload, Tables, Meteorological parameters.
Identifiers: Aerobee.

The report discusses the optimum wind layer thickness to be used for the Aerobee - 350. These layers should be small near the surface (close to the launcher) but can be relatively large at the top of the profile. The need for wind data above 100,000 feet is discussed. Results show that they are needed for the Aerobee - 350. The advisability of firing the Aerobee - 350 with a real-time met system is discussed and the conclusion reached that for best results, such a system should be used. (Author)
AD-667 921 HC$3.00 MF$0.65

DETERMINATION OF PRINCIPAL REACTIONS IN 4:1 MIXTURES OF N2 AND O2 DURING AND AFTER PULSED IONIZATION,
Ballistic Research Labs Aberdeen Proving Ground Md
For primary bibliographic entry see Field 7D.
AD-667 961 HC$3.00 MF$0.65

COSMIC-RAY NEUTRON MONITOR YIELD FUNCTIONS, GROSS TRANSFORMATION, AND NUCLEONIC COMPONENT MEAN FREE PATHS.
Revised ed.,
Chicago Univ Ill Enrico Fermi Inst for Nuclear Studies
J. E. Keith, R. W. Peterson, R. L. Tjonaman, and J. R. Wang. 4 Sep 67, 10p
AFOSR-68-0716
Contracts AF 49 (638)-1642, AF 19 (628)-2473
Revision of report dated 31 Jul 67. Prepared in cooperation with Sandia Lab., Albuquerque, N. Mex., and Los Alamos Scientific Lab., N. Mex. Research supported in part by AEC.
Availability: Published in Journal of Geophysical Research, Space Physics, v73 n1 p354-60 Jan 1 1968.

Descriptors: (*Cosmic rays, Neutrons), Troposphere, Neutron detectors, Airplanes, Balloons, Atmosphere models, Solar disturbances, Experimental data.
Identifiers: Mean free path.

In this paper, we derive the differential response function using neutron pile latitude surveys made in June 1965 at 307 g/sq. cm. over the geographic latitude ranges 59 degrees S to 17 degrees N and 30 degrees N to 53 degrees N. The specific yield function is obtained from the differential response function and the 1965 differential primary spectrum derived from satellite and balloon data. When the Gross transformation is applied, the resultant differences in differential response, varying from 17% at 15.0 Gv to 43% at 1.5 Gv are obtained. Differences from 21% to 44% are also found for the specific yield function in the rigidity range from 7 to 1.5 Gv. At large atmospheric depth, a limit is set for the applicability of the Gross transformation. Finally, we include new measurements of the nucleonic component mean free paths at 307 g/sq. cm. during solar minimum in the rigidity ranges 1 to 14 Gv. (Author)
AD-668 003 Not available from CFSTI.

APPARENT POLEWARD MOTION OF ONSETS OF AURORAL ABSORPTION EVENTS,
Defence Research Telecommunications Establishment Ottawa (Ontario) Radio Physics Lab
Doris H. Jelly. 1968, 5p Rept no. Reprint-2864
Availability: Published in Canadian Journal of Physics, v46 p33-7 1968.

Descriptors: (*Ionospheric disturbances, Motion), (*Radio waves, Absorption), Aurorae, Polar regions. Diurnal variations. Magnetosphere. Scientific satellites, Correlation techniques, Canada.
Identifiers: Alouette 1 satellite.

A study is made of nighttime auroral radio absorption events observed by riometers in the latitude range of lambda = 67-76 degrees. Individual events are shown to extend over this range with a tendency to occur later at higher latitudes. If the observed onset delay time is interpreted as a poleward expansion of the disturbance, the corresponding average velocity is 0.8 km/s. This velocity is consistent with the poleward motion observed during visual auroral substorms. The absorption events are compared statistically with energetic electron events detected by the Alouette I satellite. (Author)
AD-668 010 Not available from CFSTI.

CHANGES IN VAN ALLEN RADIATION ASSOCIATED WITH POLAR SUBSTORMS.
Revised ed.,
Cornell Univ Ithaca N Y Center for Radiophysics and Space Research
Neil Brice, and Doris Jelly. 23 Jun 67, 13p
Grant NSF-GA-878
Prepared in cooperation with Defence Research Telecommunications Establishment, Ottawa (Ontario). Radio Physics Lab. Revision of report dated 23 Mar 67.
Availability: Published in Journal of Geophysical Research, v72 n23 p5919-31 Dec 1 1967.

Descriptors: (*Van Allen radiation belt, Polar regions), Storms, Charged particles, Magnetometers, Periodic variations, Electrons, Riometers, Aurorae, Maps, Electron density, Absorption, Satellites (Artificial), Scientific satellites.
Identifiers: Alouette 1 Satellites.

Previous work has shown that precipitation of energetic electrons at auroral-zone latitudes shows two maxima, one just before midnight for soft (low-energy) electrons associated with substorms and one for harder particles in the morning hours. It is concluded from the present study that increases in precipitation in these two regions frequently show a one-to-one correspondence. The maximum flux of semitrapped electrons (E greater than 40 kev) measured by the Alouette 1 satellite in the morning hours is larger on the average by a factor of about 5 shortly after the onset of a nighttime negative bay on the magnetometer compared with shortly before. The morning cosmic noise (riometer) absorption also increases by an average of about 1 db after the onset of a nighttime polar substorm. The association found here between phenomena at widely separated longitudes strongly indicates that auroral precipitation is not a spatially isolated phenomenon, but is intimately connected with large-scale processes that occupy a substantial part of the magnetosphere. These large-scale disturbances are often isolated in time, and for such events the term elementary magnetospheric substorm (EMS) is suggested. It is found that nighttime substorms that are not associated with morning precipitation more often follow magnetically quiet conditions (during the previous 12 hours) than disturbed conditions. This observation has been interpreted as being consistent with the existence of a maximum flux limit for stably trapped energetic electrons. (Author)
AD-668 011 Not available from CFSTI.

MEDIUM FREQUENCY CONJUGATE ECHOES OBSERVED ON TOPSIDE-SOUNDER DATA,
Defence Research Telecommunications Establishment Ottawa (Ontario) Radio Physics Lab
D. B. Muldrew. 30 Aug 67, 10p
Availability: Published in Canadian Journal of Physics, v45 p3935-44 1967.

Descriptors: (*Atmospheric sounding, *Sounding rockets), (*Meteorological parameters, *Upper atmosphere), Correlation techniques, Frequency analyzers, Statistical analysis, Electron density, Periodic variations, Distribution, Instrumentation, Canada.
Identifiers: *Conjugate echoes, Ionograms, Alouette 1 Rockets, Alouette 2 Rockets, Ducting (Ionosphere).

The results of a statistical study of conjugate echoes observed on Alouette II topside-sounder data are presented and compared, where possible, with Alouette I and Explorer XX results. The percentage occurrence of conjugate echoes is either independent of Kp or decreases slightly as Kp increases from 0 to 6. Most of the data show a nighttime maximum in the occurrence of conjugate echoes; however, the occurrence of higher-frequency echoes tends to peak near 07 hours local time, which agrees with the Explorer XX results. The occurrence of conjugate echoes increases as the L value decreases from 4 to about 1.35. There is an oscillation in the occurrence of conjugate echoes with either local time or calendar date (day of the year); because of the characteristics of the satellite orbit, it is difficult to distinguish between these two possibilities at the present time.
AD-668 012 Not available from CFSTI.

CLEAR AIR TURBULENCE MEETING, 26-27 APRIL 1965, SPONSORED BY: UNITED STATES AIRFORCE.
Department of the Air Force Washington D C
1965, 283p

Descriptors: (*Clear air turbulence, Symposia), Reports, Aerodynamic loading, Scintillation, Weather forecasting, Warning systems, Climatology, Tropopause, Anisotropy, Terrain, Lasers, Temperature, Electric fields, Turbulent boundary layer, Jet streams (Meteorology), Shear stresses, Radiosondes, Viscosity, Microstructure, Radar scanning, Backscattering, Air mass analysis, Data processing systems.
Identifiers: Graphs (Charts), Wind shear.

Clear air turbulence is recognized as one of the unsolved problems in aviation meteorology. While the intensity of this high level or wind shear turbulence is not as severe as thunderstorm turbulence, it can result in injuries to passengers and crew, possible loss of control of the aircraft, and in some extreme cases some actual damage to the aircraft. The high level turbulence encounters are all the more dangerous because they usually occur without any visual warning. Work on this problem can be divided into four main categories: Data collection and analysis, theoretical studies, development of forecast techniques, and detection or warning devices. (Author)
AD-668 080 HC$3.00 MF$0.65

Group 4A—Atmospheric physics

ELECTRIC FIELD IN THE IONOSPHERE: A THEORY OF ITS ORIGIN AND EFFECT.
Environmental research papers no. 282,
Air Force Cambridge Research Labs L G Hanscom Field Mass
Hari K. Sen. Mar 68, 20p Rept no. AFCRL-68-0134
Prepared for presentation at the International Conference on the Universal Aspects of Atmospheric Electricity (4th), Tokyo (Japan), 12-18 May 68.

Descriptors: (*Ionosphere, Electric fields), Magnetic fields, Magnetosphere, Solar wind, Plasma sheath, Aurorae, Magnetic storms, Mathematical analysis, Theory.
Identifiers: E-regions, Neutral wind drag.

The anomalously high electron temperature in the lower ionosphere (E-region) cannot be attributed to photoelectrons (Spencer and Brace, 1965). In this report, it is shown that electric fields due to charge separation in the dynamo region provide adequate energy for this purpose. Application of the formula for the velocity distribution of the electrons in crossed electric and magnetic fields (Sen and Wyller, 1960) to the observational data gives electric fields perpendicular to the magnetic field of intensity about 20 to 40 V/km. This is an order of magnitude higher than that obtained in the current dynamo theory. A theory of the origin of the electric field in charge separation due to neutral wind drag is given. The theory leads to the right order of magnitude estimate of the dimensions of ionospheric irregularities. Another likely source for the electric field is where the solar wind meets the magnetosphere (magnetopause). It is shown that a field approx. 1 V/m can build up in the magnetospheric plasma sheath, as in a discharge tube, and be conducted down into the ionosphere along the lines of magnetic force. It is further shown that an electric field of this magnitude can cause the requisite auroral particle acceleration and sheath current for the main phase of magnetic storms. (Author)
AD-668 092 HC$3.00 MF$0.65

THE INTERNAL RADIATION ENVIRONMENT OF CYLINDRICAL SPACECRAFT.
Massachusetts Inst of Tech Lexington Lincoln Lab
For primary bibliographic entry see Field 22B.
AD-668 199 Not available from CFSTI.

AURORAL INPUT-OUTPUT EXPERIMENT.
Lockheed Missiles and Space Co Palo Alto Calif
Lockheed Palo Alto Research Lab
For primary bibliographic entry see Field 18C.
AD-668 202 HC$3.00 MF$0.65

RADIO PULSES FROM EXTENSIVE AIR SHOWERS AT 520 MHz.
Revised ed.,
University Coll Dublin (Ireland) Dept of Physics
D. J. Fegan, and P. J. Slevin. 4 Jan 68, 6p
AFOSR-68-0758
Grant AF-EOAR-27-67
Revision of report dated 27 Dec 67.
Availability: Published in Nature, v217 n5127 p440-1 Feb 3 1968.

Descriptors: (*Cosmic ray bursts, *Radiofrequency pulses), Predictions, Radiofrequency power, Charged particles, Radar receivers, Detectors, Mathematical analysis, Ultrahigh frequency, Noise (Radio), Gas ionization, Recombination reactions, Great Britain.

Radio pulses at frequencies below 100 MHz were detected in association with extensive air showers at the zenith and at large zenith angles. Current theories do not predict a detectable flux of RF power above 100 MHz. In this experiment a master pulse generated by a phased coincidence between two 44 MHz receivers was used to interrogate the outputs of both a 520 MHz receiver and a particle detector biased to operate at the single M-meson level. It seems that using this apparatus, tentative evidence has been obtained for ultra high frequency radio emission from extensive air showers. (Author)
AD-668 208 Not available from CFSTI.

SOME ADDITIONAL ASPECTS OF THE UNEQUAL ACTIVITY OF THE NORTHERN AND SOUTHERN SOLAR HEMISPHERES: MICROWAVE RADIO BURSTS AND SWFS,
Harvard Coll Observatory Cambridge Mass
For primary bibliographic entry see Field 3B.
AD-668 225 MF$0.65

SHORT-PERIOD VARIATIONS OF COSMIC-RAY INTENSITY,
Gujarat Univ Ahmedabad (India) Physical Research Lab
M. S. Dhanju, and V. A. Sarabhai. 31 Jul 67, 5p
AFOSR-68-0759
Grants AF-AFOSR-4-65, AF-AFOSR-4-63
Availability: Published in Physical Review Letters, v19 n5 p252-4 31 July 1967.

Descriptors: (*Cosmic rays, India), Periodic variations, Intensity, Electronic equipment, Scintillation counters, Muons, Spectrum analyzers, Galaxies.

The out-put of the large-area scintillation muon detector operated by the Bolivian air shower joint experiment has been analyzed to investigate the occurrence of time variations of galactic cosmic rays with very short periods. Persistent peaks in the power density spectrum at 18 and 25 cycles per hour have been observed. An attractive possibility of explaining the short-period fluctuation of cosmic rays through the periodic change of geomagnetic cut-off rigidities is suggested. (Author)
AD-668 227 Not available from CFSTI.

THE EFFECT OF VARIABLE CORIOLIS PARAMETER IN A PLANETARY-CIRCULATION GENERATED BY A TWO-PARAMETER QUASI-GEOSTROPHIC MODEL,
Hebrew Univ Jerusalem (Israel)
For primary bibliographic entry see Field 4B.
AD-668 273 Not available from CFSTI.

EXCITED STATES AND RYDBERG SERIES IN THE EMISSION SPECTRUM OF NO,
Basel Univ (Switzerland) Inst of Physics
For primary bibliographic entry see Field 7D.
AD-668 282 Not available from CFSTI.

MILLSTONE HILL THOMSON SCATTER RESULTS FOR 1964.
Technical rept.,
Massachusetts Inst of Tech Lexington Lincoln Lab
John V. Evans. 15 Nov 67, 53p Rept no. TR-430
ESD-TR-67-563
Contract AF 19 (628)-5167

Descriptors: (*Ionosphere, Radar signals), (*Radar signals, Backscattering), Radar stations, Electrons, Density, Ions, Temperature, Periodic variations, Altitude, Sunspots.
Identifiers: Thomson scattering, Millstone radar, Graphs (Charts).

Thomson scatter (incoherent backscatter) observations of the ionosphere were made at Millstone Hill at a wavelength of 68 cm during 1964, for 30-hour periods every two weeks. These data have been employed to derive the mean hourly F-region (200 to 700 km) electron density profile and electron and ion temperature curves in each month. The results are presented in this report, together with the derived seasonal variation of electron density (at 0600, 1200, 1800 and 2400 hours local time) and the average daytime (0900 to 1500) and nighttime (2100 to 0300) electron and ion temperature behavior. Separate measurements with a 23-cm radar permitted the temperature results reported to be extended to lower altitudes (130 km) and, in addition, provided information concerning the ionic constituents between 130 and 230 km. (Author)
AD-668 436 HC$3.00 MF$0.65

ATMOSPHERIC PATH RADIANCE CALCULATIONS FOR A MODEL ATMOSPHERE,
Radiation Research Associates Inc Fort Worth Tex
Dave G. Collins. 13 Mar 68, 30p Rept nos.
Scientific-1, RRA-M82
AFCRL-68-0124
Contract F19628-67-C-0298

Descriptors: (*Light transmission, *Mathematical analysis), (*Atmosphere models, Visibility), Monochromatic light, Background, Monte Carlo method, Altitude, Illumination, Sources, Reflection, Surfaces, Albedo, Intensity, Scattering, Reflectivity, Sky, Optical properties, Measurement.

The LITE-II Monte Carlo Program was used to calculate background radiances and path radiances as a function of altitude and direction for a model atmosphere illuminated by a broad beam monodirectional-monochromatic light source located at the top of the atmosphere. The model atmosphere has a ground level visibility of 25 km. LITE-II calculations were run for seven monochromatic plane light sources with wavelengths between 0.35 and 0.95 microns and angles of incidence between 0 and 85 degrees. Path radiances were calculated as a function of altitude and direction for each wavelength and incident angle for Lambert type ground reflection surfaces having albedoes that vary from 0 to 0.9. Intensities as a function of altitude and direction that result from light scattered by the ground were calculated for surfaces having Lambert type reflection properties. Data will be presented that show the relative importance of the path radiance and ground reflectance, as a function of both direction and altitude for the various source wavelengths and source zenith angles considered. (Author)
AD-668 482 HC$3.00 MF$0.65

THE ATMOSPHERIC AND LEAKAGE FLUX OF NEUTRONS PRODUCED IN THE ATMOSPHERE BY COSMIC RAY INTERACTIONS,
Milan Univ (Italy) Istituto Di Scienze Fisiche
G. Boella, C. Dilworth, M. Panetti, and L. Scarsi.
15 Dec 67, 38p Rept no. Scientific-5
AFCRL-68-0173
Contract AF 61 (052)-808

Descriptors: (*Cosmic rays, Interactions), (*Neutrons, *Upper atmosphere), Albedo, Charged particles, Ionization, Neutron counters, Thermal properties, Energy, Detection, Scintillation counters, Sources, Efficiency, Atmospheric sounding, Balloons, Sounding rockets, Flight paths, Intensity, Absorption, Italy.

The curve of the integrated neutron flux in the 'thermal' to 20 MeV energy range, as a function of the atmospheric depth from sea level up to 0.1 mbar, has been obtained, assuming as energy spectrum that predicted by Newkirk. The instrument employed is a combination of an hydrogeneous moderator with a slow neutron detector, with anti-coincidence rejection of background events. Four balloon flights have been carried out in March 1966; one rocket flight in July 1966. With this flight the curve has been extended to 0.1 mbar from 6 mbar, attained with the balloon flights. The neutron flux as a function of the atmospheric depth is given, at 5.3 GV geomagnetic cut-off rigidity, in quiet Sun conditions. (Author)
AD-668 483 HC$3.00 MF$0.65

SOVIET RESEARCH IN HIGH-ENERGY CHEMISTRY.
Joint Publications Research Service, Washington, D. C.
For primary bibliographic entry see Field 7D.
JPRS-44048 HC$3.00 MF$0.65

TRANSACTIONS OF THE CENTRAL AEROLOGICAL OBSERVATORY, VOLUME 52. RESULTS OF ROCKET INVESTIGATIONS OF THE ATMOSPHERE DURING THE INTERNATIONAL GEOPHYSICAL YEAR AND THE INTERNATIONAL GEOPHYSICAL COOPERATION.
Aztec School of Languages, Inc., Acton, Mass.
I. A. Khvostikov. Mar 68, 48p NASA-TT-F-11422
Contract NASW-1692
Coll- 48 P Refs Tran- Transl. Into English of the Book "trudy Tsentral'noy Aerologicheskoy Observatori, Vyp. 52. Resul'taty Raketnikh Issledovaniy Atmosphery V Period Mgg I Mgs" Moscow, Hydromet. Press, 1964 P 1-50

Descriptors: *International geophysical year, *Rocket sounding, *Sounding rockets, *Tables (data), *U.S.S.R., Arctic regions, Atmospheric composition, Meteorological charts, Stratosphere, Temperature profiles, Vertical distribution.

For abstract, see STAR 06 10.
N68-19571 HC$3.00 MF$0.65

ULTRAVIOLET DAYGLOW AND STELLAR BRIGHTNESS MEASUREMENT FROM THE X-15 AIRCRAFT.
Wisconsin Univ., Madison.
For primary bibliographic entry see Field 3A.
For abstract, see STAR 06 10.
N68-19590 HC$3.00 MF$0.65

RING CURRENT PARTICLE DISTRIBUTIONS DERIVED FROM RING CURRENT MAGNETIC FIELD MEASUREMENTS.
National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
L. J. Cahill, Jr., and R. A. Hoffman. Feb 68, 42p NASA-TM-X-63147, X-611-68-92
Grant NSG-624
Prep- Prepared in Cooperation With New Hampshire Univ.

Descriptors: *Magnetic storms, *Particle energy, *Particle flux density, *Ring currents, *Statistical distributions, Magnetic fields, Numerical analysis.

For abstract, see STAR 06 10.
N68-19786 HC$3.00 MF$0.65

A DIURNAL VARIATION OF THE INTENSITY AND ENERGY SPECTRUM OF LOW ENERGY ELECTRONS INCIDENT AT FT. CHURCHILL, CANADA.
Adelaide Univ. (Australia). Dept. of Physics.
W. R. Webber. Jan 68, 35p NASA-CR-93740
Grant NSG-281-62

Descriptors: *Canada, *Diurnal variations, *Electron flux density, Earth albedo, Electron energy, Energy spectra, Magnetospheric electron density.

For abstract, see STAR 06 10.
N68-19857 HC$3.00 MF$0.65

EXPERIMENTAL DATA AS EVIDENCE AGAINST THE HYPOTHESIS ON THE EARTH'S DUST CLOUD.
Eksperimental'nyye Dannyye Svidetel'stvuyushchiye Protiv Gipotezy O Pylevom Oblake Zemli
Volt Technical Corp., Washington, D. C.
M. M. Bredov, B. P. Konstantinov, and E. P. Mazets. 28 Mar 68, 6p NASA-CR-93742, ST-ID-IM-10696
Contract NAS5-12487
Tran- Transl. Into English From Dokl. Akad. Nauk Sssr (Moscow), V. 174, No. 3, 1967 P 580-582

Descriptors: *Cosmos satellites, *Meteoroid dust clouds, *Micrometeoroid explorer satellites, *Terrestrial dust belt, Particle density (concentration), Particle size distribution, Piezoelectric transducers, Satellite instruments.

For abstract, see STAR 06 10.
N68-19938 HC$3.00 MF$0.65

POLAR MAGNETIC DISTURBANCES AND INTRUSION OF CHARGED PARTICLES INTO THE IONOSPHERE.
Polyarnyye Magnitnyye Vozmushcheniya I Vtorzheniye Energichnykh Chastits V Ionosferu
Volt Technical Corp., Washington, D. C.
R. G. Afonina, and YA. I.Feldshteyn. 27 Mar 68, 6p NASA-CR-93794, ST-GM-PF-10691
Contract NAS5-12487
Tran- Transl. Into English From Kosmich. Issled. (Moscow), V. 6, No. 1, 1968 P 150-152

Descriptors: *Ionospheric currents, *Magnetic disturbances, *Polar regions, *Sudden ionospheric disturbances, Charged particles, Electrojets, International geophysical year, Ionospheric electron density, Ionospheric ion density.

For abstract, see STAR 06 10.
N68-20059 HC$3.00 MF$0.65

MODEL STUDIES OF LOW ENERGY PLASMA IN THE OUTER MAGNETOSPHERE.
Pennsylvania State Univ., University Park. Ionosphere Research Lab.
For primary bibliographic entry see Field 20I.
For abstract, see STAR 06 10.
N68-20287 HC$3.00 MF$0.65

CHARGE-EXCHANGE LIFETIMES FOR LOW-ENERGY PROTONS IN THE OUTER RADIATION ZONE AND IMPLICATIONS CONCERNING THE DENSITY OF ATOMIC HYDROGEN IN THE TERRESTRIAL EXOSPHERE.
State Univ. of Iowa, Iowa City. Physics and Astronomy Dept.
L. A. Frank, and R. L. Swisher. Jan 68, 31p NASA-CR-93765, REPT.-68-3
Contracts NAS5-2054, NONR-1509/06/

Descriptors: *Magnetic storms, *Outer radiation belt, *Proton density (concentration), Atmospheric models, Electrostatic probes, Exosphere, Half life, Hydrogen atoms, Ogo-c, Ring currents.

For abstract, see STAR 06 10.
N68-20293 HC$3.00 MF$0.65

VARIATIONS OF THE MAGNETIC FIELD AT HIGH LATITUDES AND STRUCTURE OF THE GEOMAGNETIC FIELD IN THE MAGNETOSPHERE.
Variatsii Magnitnogo Polya Vvysokikh Shirotakh I Struktura Geomagnit Nogo Polya V Magnitosfere
Volt Technical Corp., Washington, D. C.
YA. I.Fel Dshteyn, and A. I. Zaytsev. 31 Mar 68, 5p NASA-CR-93795, ST-GM-10693
Contract NAS5-12487
Tran- Transl. Into English From Kosmich. Issled. (Moscow), V. 6, No. 1, 1968 P 155-157

Descriptors: *Geomagnetism, *Magnetic anomalies, *Magnetosphere, Auroral zones, Charged particles, Current distribution, Magnetic disturbances, Magnetic fields, Radiation belts, Satellite observation, Solar activity effects, Solar flares.

For abstract, see STAR 06 10.
N68-20332 HC$3.00 MF$0.65

MAGNETIC FIELD IN THE TAIL OF THE MAGNETOSPHERE AND ITS DIMENSIONS.
Magnitnoye Pole V Shlyfe Magnitosfery I Yeye Razmery
Volt Technical Corp., Washington, D. C.
YA. I.Feldshteyn, A. D. Shevnin, and G. V. Starkov. 29 Mar 68, 3p NASA-CR-93796, ST-GM-PF-10692
Contract NAS5-12487
Tran- Transl. Into English From Kosmich. Issled. (Moscow), V. 6, No. 1 P 153-154

Descriptors: *Geomagnetism, *Magnetosphere, *Trapped particles, Auroral zones, Magnetic disturbances, Magnetic fields, Polar caps, Radiation belts, Solar activity effects.

For abstract, see STAR 06 10.
N68-20343 HC$3.00 MF$0.65

BALLOON OBSERVATIONS OF COSMIC X-RAY SOURCES.
Bologna Univ. (Italy). Inst. of Physics.
A. F. Baseggio, D. Brini, U. Ciriegi, F. Fuligni, and G. Vespignani. 1967, 12p

Descriptors: *Balloons, *Cosmic rays, *Radiation sources, Angles (geometry), Astrophysics, Azimuth, Emission spectra, Flux density, X ray density measurement, X rays.

For abstract, see STAR 06 10.
N68-20404 HC$3.00 MF$0.65

PROBLEMS OF ROCKET-BORNE ELECTRIC FIELD MEASUREMENTS IN THE IONOSPHERE.
Royal Inst. of Tech., Stockholm (Sweden). Saab Aircraft Co., Linkoping (Sweden). Electron and Plasma Physics Div.
R. Bostroem, C. G. Faelthammar, and U. Fahleson. Dec 67, 130p REPT.-67-24
Prep- Prepared for Saab Aircraft Co.

Descriptors: *Electric fields, *Ionosphere, *Rocket-borne instruments, Auroral zones, Electrical measurement, Ionospheric currents, Ionospheric electron density, Magnetosphere.

For abstract, see STAR 06 10.
N68-20423 HC$3.00 MF$0.65

TRANSPORT AND ACCELERATION OF RADIATION BELT PARTICLES.
Royal Inst. of Tech., Stockholm (Sweden). Electron and Plasma Physics Div.
C.-G. Faelthammar. 15 Feb 68, 30p REPT.-68-04
Conf- Presented At the Lecture, Toulouse, 21-23 Feb. 1968

Descriptors: *Conferences, *Electric fields, *Magnetic disturbances, *Magnetically trapped particles, *Particle acceleration, *Transport properties, Adiabatic conditions, Geomagnetism, Magnetic fields, Magnetosphere, Particle collisions, Radiation belts, Solar wind.

For abstract, see STAR 06 10.
N68-20442 HC$3.00 MF$0.65

ESTIMATE OF CORPUSCULAR RADIATION DOSE RATES FOR TYPICAL BLACK ARROW SATELLITES.
Royal Aircraft Establishment, Farnborough (England).
C. J. Savage. Aug 67, 22p RAE-TR-67206

Descriptors: *Black knight rocket vehicle, *Corpuscular radiation, *Radiation dosage, *Rates (per time), Circular orbits, Material absorption, Polar orbits, Quality control, Satellite design, Twenty-four hour orbits.

For abstract, see STAR 06 10.
N68-20447 HC$3.00 MF$0.65

METEORIC PHENOMENA IN THE EARTH'S ATMOSPHERE. INVESTIGATIONS OF METEORS, NO. 2.
Bellcomm, Inc., Washington, D. C.
B. L. Kashcheyev, M. F. Lagutin, and V. N. Lebedinets. Apr 68, 295p NASA-CR-93816
Contract NASW-417
Tran- Transl. Into English of the Publ. "meteornyye Yavleniya V Atmosfere Zemli" Moscow, Issled. Meteorov. Izd. Nauka, 1967 P 1-260

Group 4A—Atmospheric physics

Descriptors: *Atmospheric ionization, *Meteoroids, *Radiance, *Radio observation, Bibliographies, Catalogs, Meteor trails, Radio waves.

For abstract, see STAR 06 10.
N68-20463 HC$3.00 MF$0.65

SOLAR FLARE EFFECTS AND VLF RADIO WAVE OBSERVATIONS OF THE LOWER IONOSPHERE.
Royal Aircraft Establishment, Farnborough (England).
B. Burgess, and T. B. Jones. Aug 67, 23p RAE-TR-67201

Descriptors: *Lower ionosphere, *Radio waves, *Solar flares, *Very low frequencies, *Wave propagation, Electron density profiles, Ionization, Ionospheric electron density, Ionospheric ion density, Solar activity effects, Solar x-rays.

For abstract, see STAR 06 10.
N68-20487 HC$3.00 MF$0.65

A PROPOSED ROCKET-BORNE PHOTOMETER.
Royal Aircraft Establishment, Farnborough (England).
C. T. Farr. Jul 67, 14p RAE-TR-67168
Conf- Presented At the Conf. on Astron. Opt., London, 10-12 Jul. 1967 Spon- Jointly Sponsored By Inst. of Phys., Phys. Soc. and Roy. Astron. Soc.

Descriptors: *Photometers, *Rocket-borne instruments, *Sky brightness, *Skylark rocket vehicle, Amplifier design, Cassegrain optics, Conferences, Dayglow, Linear systems, Optical measurement, Photoluminescence, Stars, Zodiacal light.

For abstract, see STAR 06 10.
N68-20495 HC$3.00 MF$0.65

SLOW ONSET TYPE PCA EVENTS AND ASSOCIATED PRE-SSC POLAR GEOMAGNETIC DISTURBANCES.
National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
Y. Hakura, and M. Nagai. Mar 68, 12p NASA-TM-X-63140, X-641-68-85

Descriptors: *Magnetic disturbances, *Polar cap absorption, *Solar activity effects, Cosmic rays, Geomagnetism, Ionosphere, Magnetic anomalies, Protons, Solar flares.

For abstract, see STAR 06 10.
N68-20498 HC$3.00 MF$0.65

VARIATIONS IN AIR DENSITY AT HEIGHTS NEAR 150 KM, FROM THE ORBIT OF THE SATELLITE 1366-101 G.
Royal Aircraft Establishment, Farnborough (England).
J. Hingston, and D. G. King-hele. Aug 67, 24p RAE-TR-67171
Conf- Presented At the Cospar Symp., London, Jul. 1967

Descriptors: *Density measurement, *Diurnal variations, *Numerical analysis, *Satellite orbits, *Upper atmosphere, Aerodynamic coefficients, Conferences, Drag, Error analysis, Geomagnetism, Orbit decay, Orbit perturbation, Orbital elements, Perigees, Scale height, Solar activity.

For abstract, see STAR 06 10.
N68-20500 HC$3.00 MF$0.65

REPORT OF NRL PROGRESS.
Naval Research Lab., Washington, D. C.
For primary bibliographic entry see Field 14B.
PB-177 877 HC$3.00 MF$0.65

MEASUREMENT OF DRAFT SPEEDS IN CONVECTIVE CLOUDS BY MEANS OF PULSED-DOPPLER RADAR,
Arizona Univ., Tucson. Inst. of Atmospheric Physics.
For primary bibliographic entry see Field 17I.
PB-178 016 HC$3.00 MF$0.65

4B. Meteorology

THE DIURNAL TIDE NEAR THE STRATOPAUSE OVER WHITE SANDS MISSILE RANGE, NEW MEXICO,
Atmospheric Sciences Lab White Sands Missile Range N Mex
Norman J. Beyers, Bruce T. Miers, and Elton P. Avara. Feb 68, 35p
ECOM-5180

Descriptors: (*Atmospheric tides, Diurnal variations), (*Wind, *Upper atmosphere), (*Guided missile ranges, *Sounding rockets), Mesosphere, Stratosphere, Weather forecasting, Statistical analysis, Payload, Meteorological parameters, Radiosondes, Oscillation, Radar tracking, Tables, Atmospheric temperature, New Mexico.
Identifiers: Summer (Season), Stratopause.

The results of the analysis of over three hundred meteorological rocket soundings of the stratosphere and lower mesosphere are summarized. Two basic parts of the summary are the atmospheric tidal experiments and the delineation of the diurnal tide in summer data obtained over White Sands Missile Range. Phase and amplitude determinations of the diurnal variation of the zonal and meridional components were significant and predictable. These values then could be used to improve wind forecasts and existing statistical summaries of the Meteorological Rocket Network in the summer stratopause region over White Sands Missile Range, New Mexico. (Author)
AD-667 909 HC$3.00 MF$0.65

PRELIMINARY STUDY OF THE WIND FREQUENCY RESPONSE OF THE HONEST JOHN M50 TACTICAL ROCKET,
Atmospheric Sciences Lab White Sands Missile Range N Mex
For primary bibliographic entry see Field 19G.
AD-667 910 HC$3.00 MF$0.65

BALLISTIC WINDS STUDY.
Quarterly rept. no. 2, 1 Jun-31 Aug 67,
Travelers Research Center Inc Hartford Conn
Frederick P. Ostby, Jr. Apr 68, 27p Rept no. TRC-7486-278
ECOM-0296-2
Contract DAAB07-67-C-0296

Descriptors: (*Radiosondes, Networks), (*Wind, Arizona), Weather stations, Periodic variations, Thickness, Altitude, Tables, Mapping, Time, Upper atmosphere, Weather forecasting.
Identifiers: *Ballistic winds.

Space and time variability studies were conducted for the 12-rawin station mesonetwork of southeastern Arizona. The space variability studies showed that for low levels (below 1000 meters) there was only a slight increase in variability as a function of station separation. The root-mean square space difference of the vector wind (RMSSD) is 8.0 knots for stations within 20 km of each other, while the RMSSD is 9.6 knots for stations 120-140 km apart. At high levels (e.g., 8000 m) the variability difference with distance is sizeable. Investigations of time variability indicated the increase in variability with increasing time lag is less at low levels than at high levels. At low levels (around 1000 m) there is not much difference between a 2-hr old observation and one that is 8 hours old. At about 8,000 meters, the variability increased markedly with increasing time lag. From time variability profiles this is seen to be the level of maximum time variability for all lags with the variability diminishing rapidly with height thereafter. (Author)
AD-667 912 HC$3.00 MF$0.65

ACOUSTICAL, METEOROLOGICAL, AND SEISMIC DATA REPORT - SOTRAN V AND VI,
Atmospheric Sciences Lab White Sands Missile Range N Mex
For primary bibliographic entry see Field 19D.
AD-667 915 HC$3.00 MF$0.65

A STUDY OF ACOUSTIC MONITORING OF THE GUN PROBE SYSTEM,
Atmospheric Sciences Lab White Sands Missile Range N Mex
Walter S. Nordquist, Jr. Nov 67, 63p
ECOM-5166

Descriptors: (*Projectiles, Gun launched), (*Sound signals, Atmosphere), Guided missile ranges, Meteorological instruments, Acoustic detectors, Accuracy, Radar tracking, Optical tracking, Sound transmission, Payload, Errors, Configuration, Meteorological parameters, Tables, New Mexico.
Identifiers: Gun probe project, Acoustic ray tracing.

A single array acoustic sensor system has been used to detect the various acoustic events associated with a series of seven firings of the Atmospheric Sciences Laboratory gun probe at White Sands Missile Range, New Mexico. The acoustic events detected included launch, grenade explosion, and acoustic signals associated with the descent of various parts of the projectile. The results are presented by type of event and individual round and are compared to the available radar and optical tracking data. The results indicate that an acoustic system can be used to locate certain events occurring at horizontal ranges of fifteen to twenty miles with accuracies of a few hundred feet. Some of these events are of a nature which neither radar nor optical systems can 'recognize.' (Author)
AD-667 917 HC$3.00 MF$0.65

A DATA REDUCTION TECHNIQUE FOR METEOROLOGICAL WIND DATA ABOVE 30 KILOMETERS,
Atmospheric Sciences Lab White Sands Missile Range N Mex
For primary bibliographic entry see Field 16B.
AD-667 918 HC$3.00 MF$0.65

PREDICTING DIFFUSION OF ATMOSPHERIC CONTAMINANTS BY CONSIDERATION OF TURBULENT CHARACTERISTICS OF WSMR,
Atmospheric Sciences Lab White Sands Missile Range N Mex
Frank V. Hansen. Jan 68, 40p
ECOM-5170

Descriptors: (*Atmospheric motion, Intensity), (*Air pollution, Predictions), Micrometeorology, Guided missile ranges, Turbulent boundary layer, Meteorological parameters, Regression analysis, Mathematical models, Diffusion, Toxicity, Propellants, Tables, New Mexico.

The relationships between the turbulent intensities about the mean flow in the lowest layers of the atmosphere at White Sands Missile Range, New Mexico, and climatological data are discussed in terms of predicting the diffusion of contaminants into the atmosphere. If the turbulent fluctuations observed in the lower portion of the boundary layer are considered representative, then correlations with climatological summaries may be used as a rudimentary estimator for estimating the diffusion power of the atmosphere. A simple empirical diffusion model for general use is also given. (Author)
AD-667 920 HC$3.00 MF$0.65

A COMPUTER STUDY OF THE WIND FREQUENCY RESPONSE OF UNGUIDED ROCKETS,

Atmospheric Sciences Lab White Sands Missile Range N Mex
Edward M. D'Arcy. Feb 68, 29p
ECOM-5177

Descriptors: (*Sounding rockets, Impact prediction), (*Wind, Rocket trajectories), (*Free flight trajectories, Wind), Guided missile ranges, Exterior ballistics, Meteorological balloons, Frequency, Computers, Accuracy, Response, Thickness, Phototheodolites, Atmospheric sounding, Hypersonic test vehicles, Surface-to-air, Surface-to-surface, Tables.
Identifiers: Jimspheres, Aerobee, Athena, Nike-Apache, Ballistic meteorology.

The wind frequency response of several unguided rockets was studied using data collected by simultaneous releases of a jimsphere and a standard 100 gm balloon. Results show there can be large differences in the predicted rocket impacts using the two balloons. High wind frequencies are shown to affect the rocket only to a small degree and can be ignored in real-time rocket impact prediction applications. Averaging winds over a fifty-foot layer gives results comparable to the best Fourier smooth and binomial filter. (Author)
AD-667 922 HC$3.00 MF$0.65

REAL-TIME COMPUTATIONS OF PILOT BALLOON WINDS,
Atmospheric Sciences Lab White Sands Missile Range N Mex
Bernard F. Engebos, and Louis D. Duncan. Mar 68, 25p
ECOM-5184

Descriptors: (*Wind, Upper atmosphere), (*Meteorological balloons, Wind), Altitude, Balloons, Mathematical analysis, Polynomials, Flight paths, Tracking, Impact prediction, Errors, Sounding rockets, Velocity, Accuracy.
Identifiers: *Ballistic meteorology.

The report shows that the mean wind through a given altitude layer can be determined from balloon tracking data without computing wind values for individual points within the altitude layer. The assumptions involved in the procedure are similar to the assumption made in numerical differentiating techniques, i.e., the position can be approximated by a polynomial. Two such techniques are investigated. One uses a linear equation to approximate the position; the other uses a cubic equation. These techniques were applied to balloon data from 27 balloon tracks and compared with results obtained from numerical differentiation. It is shown that there is very little difference among the results of the various calculation procedures. (Author)
AD-667 923 HC$3.00 MF$0.65

UNGUIDED ROCKET BALLISTICS METEOROLOGY CONFERENCE, 31 OCTOBER-2 NOVEMBER 1967. ADDENDUM,
Atmospheric Sciences Lab White Sands Missile Range N Mex
Elmer J. Trawle. 2 Nov 67, 211p
Addendum to preprints of papers to be presented at the Unguided Ballistics Meteorology Conference, 31 Oct-2 Nov 67, New Mexico State Univ., University Park. See also AD-661 631.

Descriptors: (*Rockets, Symposia), (*Meteorological parameters, *Upper atmosphere), Aerodynamics, Wind, Phototheodolites, Radar tracking, Wind tunnel models, Drag, Mathematical analysis, Infrared equipment, Stability, Velocity, Refraction, Measurement, Abstracts, Reports, Artillery rockets, Sounding rockets, New Mexico, Model tests, Smoke projectiles.

Contents: Basic aerodynamics of rockets; A technique for evaluating the stability of missiles in free-flight; Use of the wind tunnel for determining aerodynamic stability coefficients; The measurement of integrated refractivity for evaluating atmosphere-induced radar ranging errors; A smoke rocket technique for daytime wind measurements to three thousand feet; Comparison results from radar tracker and contraves photo-theodolite; Errata-empirical determination of drag. (Author)
AD-667 928 HC$3.00 MF$0.65

A GENERAL NOMOGRAPH FOR NORMAL AND SKEWED FREQUENCY DISTRIBUTIONS: CLIMATOLOGICAL AND OTHER APPLICATIONS.
Technical rept.,
Army Natick Labs Mass Earth Sciences Div
Earl E. Lackey. Jul 67, 54p Rept no. ES-26
USA-NLABS-TR-68-40-ES

Descriptors: (*Weather forecasting, *Pattern recognition), Predictions, Frequency, Periodic variations, Intensity, Reliability, Climatology, Meteorological parameters, Rainfall, Industrial psychology, Psychometrics, Atmospheric temperature, Maps, Weather, Tables.
Identifiers: Graphs (Charts).

Extended experience in the construction and use of several different predictive nomographs covering a wide range of frequency distributions of various types of weather and other phenomena, suggested the probability that a universal series of patterns of frequency distributions might permeate the whole of nature. This study is based in part on the several nomographic patterns developed in previous studies. It assumes that all of the frequency distributions we are likely to encounter in practical climatology, whether symmetrical or asymmetrical (skewed), may be fairly well approximated by a family of cumulative frequency curves, provided they are plotted on such a scale that 100 units represents the whole range of observational experience in each. The predictive patterns in the General Nomograph and its associated table depend for their operation on the numerical position of the mean (average) between the two extremes (maximum and minimum) in the frequency distribution, when the three related measures are reduced to a 100-unit scale. The means of frequency distributions having various degrees of skewness lie along a diagonal line from the lower left to the upper right of the basic section of the nomograph. Other lines (curved) trace the values of other percentile or fractional parts of the various distributions. The construction, use and reliability of this nomograph and its associated table are given in this report. (Author)
AD-667 929 HC$3.00 MF$0.65

THE ENERGY BUDGET AT THE EARTH'S SURFACE: A STUDY OF THE CARBON DIOXIDE CONCENTRATION MONITORED OVER AN AGRICULTURAL FIELD NEAR ITHACA, N. Y.
Research rept.,
Agricultural Research Service Ithaca N Y Soil and Water Conservation Research Div
L. H. Allen, Jr. Feb 68, 260p Rept no. SWC-ARS-RR-400
ECOM-2-681-3
Prepared in cooperation with Cornell Univ., Ithaca, N. Y. See also AD-664 220.

Descriptors: (*Atmosphere, *Carbon dioxide), Agriculture, Energy, Interactions, Gases, Micrometeorology, Respiration, Diurnal variations, Air mass analysis, Evaporation, Wind, Solar radiation, Periodic variations, Surface properties, Velocity, Snow, Climatology.
Identifiers: Sinks.

Carbon dioxide concentration was monitored from July to December 1962, and from January to June 1964 over an agricultural field using an infrared CO2 analyzer. Supporting micrometeorological data, including windspeed, incident shortwave radiation, net radiation, air temperature, and soil temperature were taken during part of the monitoring program. The CO2 concentration showed an annual cycling much stronger than has been observed over oceans or at high altitudes. The computed average annual daytime CO2 concentration near the earth's surface was 312 ppm. Diurnal cycles in concentration during the summer months frequently showed ranges in excess of 200 ppm. During July, August, and September 1962, the daytime average CO2 concentration at the top of the vegetation (corn) was about 291 ppm. In the diurnal cycle of CO2 concentration the daytime average CO2 concentration was very steady over an individual day, with little or no decrease during the course of a day after the nocturnal build-up had been dispersed or consumed. Incident shortwave radiation had a relatively small effect on CO2 concentration. Nighttime CO2 build-up was found to be directly proportional to mean temperature, soil-to-air temperature difference, and inversely proportional to windspeed. After harvest of the 1962 crop (corn), the diurnal cycle was altered, with a more gradual drawdown of CO2 occurring throughout the daylight period. After snow-cover, diurnal variations became quite small, the typical maximum range being 22 ppm. (Author)
AD-667 996 HC$3.00 MF$0.65

QUESTIONS OF ATMOSPHERIC DIFFUSION AND AIR POLLUTION: SELECTED ARTICLES.
Foreign Technology Div Wright-Patterson AFB Ohio
For primary bibliographic entry see Field 13B.
AD-668 053 HC$3.00 MF$0.65

ON THE QUESTION OF THE CONSTRUCTION OF A STATIONARY MAGNETOHYDRODYNAMIC MODEL OF A CYCLONE,
Foreign Technology Div Wright-Patterson AFB Ohio
For primary bibliographic entry see Field 20I.
AD-668 067 HC$3.00 MF$0.65

CBE FACTORS MONTHLY SURVEY NO. 24.
Library of Congress Washington D C Aerospace Technology Div
For primary bibliographic entry see Field 15B.
AD-668 075 HC$3.00 MF$0.65

A FEASIBILITY AND DESIGN STUDY FOR AN AIRBORNE RADIOMETRIC SYSTEM TO MEASURE REMOTELY THE VERTICAL PROFILE OF TEMPERATURE, HUMIDITY, AND PRESSURE.
Final rept. 1 Sep 66-30 Nov 67,
Sperry Rand Research Center Sudbury Mass
Wayne D. Mount, and B. Richard Fow. Feb 68, 60p Rept no. SRRC-CR-68-15
AFCRL-68-0107
Contract AF 19 (628)-6133

Descriptors: (*Meteorological parameters, Measurement), (*Radiometers, Airborne), Atmospheric temperature, Barometric pressure, Humidity, Atmosphere models, Infrared radiation, Microwaves, Oxygen, Carbon dioxide, Correlation techniques, Accuracy, Resolution, Radiosondes.
Identifiers: Weather reconnaissance planes, *Passive remote probing.

Microwave and infrared radiation from atmospheric oxygen and carbon dioxide was computed for different types of atmospheres. Functions were derived which specified the relative radiative contribution from different layers in the atmosphere and these functions were found to be reasonably constant for extreme atmospheric conditions. Methods were developed for remotely measuring the temperature and pressure height profiles from 100 mb to the surface. The infrared results were more accurate, giving a probable error of about 0.8 deg C as opposed to 1.0 deg C for the microwave. This difference in accuracy is not significant when compared against the far greater all weather capability obtained with the microwave technique. Errors in remote probing from 100 mb looking downward are the largest in the lowest layers of the atmosphere. Nevertheless, the analytical feasibility of remotely measuring the air temperature and pressure height profiles has been established with the results approaching that of ground-based radiosondes. (Author)
AD-668 086 HC$3.00 MF$0.65

AN EVALUATION OF THE OPERATIONAL UTILITY OF DIRECT READOUT INFRARED SATELLITE DATA.
Technical rept.,
Air Weather Service Scott AFB Ill
Serhij Pilipowskyi. Mar 68, 21p Rept no. AWS-TR-199

Descriptors: (*Meteorological satellites, *Infrared equipment), (*Weather forecasting, Early warning systems), Infrared scanning, Radiometers, Meteorological parameters, Electronic recording systems, Accuracy, Orbital trajectories, Periodic variations, Resolution, Cloud cover, Storms, Atmospheric temperature, Effectiveness.
Identifiers: Nimbus 1 satellite, Nimbus 2 satellite, Summer (Season).

The study attempts to answer the question of the utility of direct-readout infrared data on the basis of data obtained from the Nimbus I and II spacecraft. Both spacecraft provided infrared data to a central readout station of the National Aeronautics and Space Administration. The high-resolution infrared data (HRIR) was recorded on 70mm film and is of photographic quality. The data sample is limited to September of 1964 and May thru November of 1966, the operating lifetimes of these infrared systems. A large number of HRIR pictures were available for this evaluation, as well as several DRIR data samples. The DRIR pictures were obtained from the Joint Typhoon Warning Center (JTWC) at Guam where a Navy APT set had been modified to receive DRIR data. Additional input into this study came from an evaluation of DRIR by the US Navy, from a large number of technical publications on this subject, and from personal contact with those who had worked with DRIR data. (Author)
AD-668 125 HC$3.00 MF$0.65

AIR LAUNCHED BALLISTIC RADIOSONDE DISPENSER EQUIPMENT F 3 TYPE: DESCRIPTION AND INSTRUCTIONS FOR USE.
Sprenger (Albin) Sankt Andreasberg (West Germany)
Jul 58, 78p
Contract AF 61 (514)-969
See also AD-668 210.

Descriptors: (*Radiosondes, Air drop operations), (*External stores, Radiosondes), Launching, Control panels, Telemeter systems, Recording systems, Instrumentation, Jet training planes, Instruction manuals, West Germany, Air-to-surface.
Identifiers: *Ballistic radiosondes, K-55 radiosondes, F-3 dispensers, T-33 aircraft.

The document contains the description and the instructions for use of the Radiosonde Dispenser Pod F-3 type and its accessories as control panel and play back unit. The Radiosonde Dispenser Pod is to be fastened to the Jato bottle lugs on the underside of the fuselage of an aircraft, specially of the T-33 type. The control panel for remote control of the dropsonde release and of the recorder of the sonde signals is to be mounted on a convenient place inside the cockpit of the aircraft. A 15-core cable fits the radiosonde dispenser with electric power from the aircraft 28 volts electrical system and contains the wires which are necessary for controlling and indicating the proceedings inside the dispenser pod. The play back unit is to be installed in a room on the ground where evaluating of the dropsonde data takes place. (Author)
AD-668 209 HC$3.00 MF$0.65

TECHNICAL DESCRIPTION AND SERVICE INSTRUCTION FOR AIR LAUNCHED BALLISTIC RADIOSONDE K 55 - E.
Graw (Josef) Messgeraete G M B H Nurenberg (West Germany)
18 Apr 58, 48p
Contract AF 61 (514)-969
See also AD-668 210.

Descriptors: (*Radiosondes, Air drop operations), Telemeter systems, Recording systems, Barometers, Thermometers, Hygrometers, Power supplies, Calibration, Maintenance, Instruction manuals, West Germany, Air-to-surface.
Identifiers: *Ballistic radiosondes, K-55 radiosondes.

Radiosonde K 55 is an instrument used for meteorological measuring of the free atmosphere. An airplane flying in 50,000 feet altitude with high speed (500 kn) launches a radiosonde every 110 miles approx. The radiosonde descends very fastly thus reaching the sea level before the next one is released. During the descent the radiosonde measures the meteorological values: barometric pressure, relative humidity and atmospheric temperature; same are transmitted as Morse code impulse values. These Morse code signals are received in the airplane and taken up by a wire record. After launching all radiosondes the airplane returns to the airfield (ground station); there the wire records are plaid off and evaluated. For quicker evaluation of the measurements the Morse code signals of the radiosonde may also be transmitted to the ground station by a high-powered relay transmitter. (Author)
AD-668 210 HC$3.00 MF$0.65

THE EFFECT OF VARIABLE CORIOLIS PARAMETER IN A PLANETARY-CIRCULATION GENERATED BY A TWO-PARAMETER QUASI-GEOSTROPHIC MODEL.
Hebrew Univ Jerusalem (Israel)
Abraham Huss. Sep 64, 6p
Contract AF 19 (604)-4963, Grant AF-EOAR-108-63
Research supported in part by National Science Foundation, Grant NSF-G14698.
Availability: Published in Journal of the Atmospheric Sciences, v21 n5 p507-12 September 1964.

Descriptors: (*Atmospheric motion, Atmosphere models), (*Atmosphere models, Coriolis effect), Perturbation theory, Atmospheric temperature, Jet streams (Meteorology), Mathematical prediction, Barometric pressure, Wind.
Identifiers: Computer analysis.

The governing equations of a two-level quasigeostrophic model were integrated twice for periods of about 10 days, once including variation of the Coriolis parameter (the beta term) and once excluding it. As expected, the exclusion of the beta-term resulted in a quicker rate of development. The evolving perturbation had almost the same pattern in the two cases, but the final distribution of the mean zonal winds was different. In the beta= 0 case the zonal velocities in the central region tended towards a barotropic pattern, while a baroclinic jet was formed in the case where beta was not equal to zero. The numerical integration is also compared with linear theory. (Author)
AD-668 273 Not available from CFSTI.

DISTRIBUTION AND DIMENSIONS OF CLOUD COVER AT ALTITUDES ABOVE 20,000 FEET.
Final rept.,
Lockheed Missiles and Space Co Sunnyvale Calif
R. H. Blackmer, Jr. May 64, 50p
Contract AF 04 (647)-787
Prepared in cooperation with Stanford Research Inst., Menlo Park, Calif. Proj. SRI-4649.

Descriptors: (*Cloud cover, Distribution), Thunderstorms, High altitude, Meteorological parameters, Radiosondes, Tropopause, Cirrus clouds, Radar echo areas, Penetration, Aerial photographs, Aerial reconnaissance.
Identifiers: U-2 aircraft.

The research described in this Final Report is directed toward finding methods of specifying the most probable distribution of cloud-top altitudes within areas where high-altitude clouds are likely to exist. During a nine-month period, three cases were studied utilizing cloud photographs from U-2 aircraft and pertinent concurrent meteorological data. The cloud photographs were analyzed by methods developed at Stanford Research Institute to determine the dimensions and distributions of clouds above 20,000 ft. Meteorological data--such as hourly cloud observations, six-hourly synoptic charts, twelve-hourly radiosonde ascents, and hourly summaries of radar echoes--were analyzed to determine the state of the atmosphere as well as time changes in atmospheric conditions related to cloud cover. Maximum cloud tops were found to penetrate the tropopause by as much as 10,000 ft and radar echo penetrations of 15,000 ft were noted in moist tropical air. (Author)
AD-668 314 HC$3.00 MF$0.65

THE OPERATIONAL DISSIPATION OF SUPERCOOLED FOG: PROJECT COLD COWL 1967-1968.
Technical rept.,
Air Weather Service Scott AFB Ill
Herbert S. Appleman. Apr 68, 16p Rept no. AWS-TR-205

Descriptors: (*Fog, Removal), (*Weather, *Control systems), All-weather aviation, Take-off, Aircraft landings, Airfields, Military facilities, Clouds, Carbon dioxide, Silver compounds, Alaska, Iodides, Meteorological phenomena, Transport planes, Particle size, Test methods, Ice fog.
Identifiers: Cold Cowl project, C-130 aircraft, WC-130E aircraft, *Weather modification, Seedants, Dry ice, Cloud seeding.

In the winter of 1967-1968, the Air Weather Service (AWS) carried out its first operational weather-modification program at Elmendorf AFB. An AWS weather-reconnaissance aircraft (WC-130E) was used to seed supercooled fog with dry ice. A prescribed flight path was flown a specified distance upwind from the target area, and crushed dry ice disseminated at rates of 12.5 or 25 pounds per mile. It was found that a clearing generally occurred in 30 to 45 minutes. The only real failure occurred in a case that may have been an ice fog; in addition, proper positioning of the hole proved a major problem throughout the program. Despite these difficulties, an estimated 200 successful take-offs and landings were made using the artificially produced clearings. Supplemental tests were carried out using airborne liquid CO2 dispensers and silver iodide pyrotechnics. (Author)
AD-668 439 HC$3.00 MF$0.65

BIBLIOGRAPHY ON THE CLIMATE OF CHILE.
Environmental Science Services Administration, Silver Spring, Md.
1967, 22p WB/BC-12, PB-176732

Descriptors: *Bibliographies, *Chile, *Climate, Meteorology, Rain, South america, Thunderstorms, Weather forecasting, Wind variations.

For abstract, see STAR 06 10.
N68-19509 HC$3.00 MF$0.65

OBSERVATION AND ANALYSIS OF THE SURFACE WIND OVER THE OCEAN.
Koninklijk Nederlands Meteorologisch Instituut, the Hague.
G. Verploegh. 1967, 60p REPT.-89
1967 Coll- 60 P Refs

Descriptors: *Gust loads, *Oceans, *Wind profiles, Gusts, Meteorological charts, Oceanography, Surface waves, Velocity distribution, Wind (meteorology), Wind measurement, Wind pressure.

For abstract, see STAR 06 10.
N68-19679 HC$3.00 MF$0.65

INVESTIGATION OF METEOROLOGICAL AND IONOSPHERIC CONDITIONS OF THE OCCURRENCE OF NOCTILUCENT CLOUDS IN SIBERIA.

K Izucheniyu Meteorologicheskikh I Ionosfernykh Usloviy Poyavleniya Serebristykh Oblakov S Sibiri
Scripta Technica, Inc., Washington, D. C.
N. N. Fast. Mar 68, 6p NASA-TT-F-11525
Contract NASW-1694
Coll- 6 P Refs Tran- Transl. Into English From Meteorol. Issled. (Moscow), No. 12, 1966 P 106-110

Descriptors: *Ionospheric composition, *Noctilucent clouds, *Siberia, *Statistical analysis, *Synoptic meteorology, Luminescence, U.S.S.R..

For abstract, see STAR 06 10.
N68-19753 HC$3.00 MF$0.65

CLIMATOLOGY OF AMSTERDAM AIRPORT (SCHIPHOL).
Koninklijk Nederlands Meteorologisch Instituut, the Hague.
1966, 145p REPT.-87
1966 Coll- 145 P

Descriptors: *Climatology, *Humidity, *Netherlands, *Visibility, *Wind (meteorology), Clouds (meteorology), Precipitation (meteorology), Tables (data).

For abstract, see STAR 06 10.
N68-19772 HC$3.00 MF$0.65

THE SOUTHERN OSCILLATION AND WORLD WEATHER.
de Zuidelijke Schommeling en Haar Mondiale Uitbreiding
Koninklijk Nederlands Meteorologisch Instituut, the Hague.
H. P. Berlage. 1966, 148p REPT.-88

Descriptors: *Meteorology, *Oceanography, *Southern hemisphere, Asia, Indian ocean, Oscillations, Peru, Variations.

For abstract, see STAR 06 10.
N68-19855 HC$3.00 MF$0.65

AIRBORNE INSTRUMENTATION FOR A CLOUD PHYSICS RESEARCH PROJECT.
National Research Council of Canada, Ottawa (Ontario).
K. G. Pettit. Oct 67, 77p NRC-9978, LR-490

Descriptors: *Cloud seeding, *Meteorological instruments, *Rain, *Weather modification, Airborne equipment, Cloud physics, Precipitation (meteorology), Rain gages, Silver iodides.

For abstract, see STAR 06 10.
N68-19869 HC$3.00 MF$0.65

WIND AND WAVE DATA OF NETHERLANDS LIGHT VESSELS SINCE 1949.
Wind- en Golfgegevens Van Nederlandse Lichtschepen Sinds 1949
Koninklijk Nederlands Meteorologisch Instituut, the Hague.
R. Dorrestein. 1967, 119p REPT.-90
1967 Coll- 119 P Refs

Descriptors: *Ships, *Tables (data), *Water waves, *Wind measurement, Meteorology, Netherlands, Northern hemisphere, Oceanography, Wind profiles.

For abstract, see STAR 06 10.
N68-19888 HC$3.00 MF$0.65

METEOROLOGICAL SATELLITE DATA, PART 2 FINAL REPORT, MAR. 1966 - JUN. 1967.
Hebrew Univ., Jerusalem (Israel). Dept. of Meteorology.
J. Neumann. Jul 67, 37p PB-177066
Contract CWB-11055
Prep- Prepared in Cooperation With Israel Min. of Transport and Commun. Meteorol. Serv.

Descriptors: *Cloud cover, *Israel, *Lee waves, *Mountains, *Satellite observation, *Statistical weather forecasting, Air masses, Clouds (meteorology), Jet streams (meteorology), Meteorological satellites, Moisture content, Photointerpretation.

For abstract, see STAR 06 10.
N68-20234 HC$3.00 MF$0.65

SCALAR AND COMPONENT WIND CORRELATIONS BETWEEN ALTITUDE LEVELS FOR CAPE KENNEDY, FLORIDA, AND SANTA MONICA, CALIFORNIA.
National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
G. E. Daniels, and O. E. Smith. Apr 68, 118p
NASA-TN-D-3815
Contract 124-12-03-00-62

Descriptors: *California, *Correlation coefficients, *Florida, *Wind profiles, Cape kennedy launch complex, Data processing, Mathematical models, Spacecraft design, Statistical analysis, Statistical distributions, Vertical distribution, Wind measurement, Wind velocity.

For abstract, see STAR 06 10.
N68-20278 HC$3.00 MF$0.65

INVESTIGATION OF AIR-FLOW VELOCITY BY LASER BACKSCATTER.
National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
K. R. Bourquin, and F. H. Shigemoto. Apr 68, 23p
NASA-TN-D-4453
Contract 125-22-02-02-00-21

Descriptors: *Backscattering, *Clear air turbulence, *Laser modes, *Light scattering, Air flow, Airborne equipment, Flow visualization, Hot-wire anemometers, Scatter propagation, Velocity distribution.

For abstract, see STAR 06 10.
N68-20375 HC$3.00 MF$0.65

THE UTILITY OF SATELLITE CLOUD PHOTOGRAPHS IN OBJECTIVE ANALYSIS OF THE 500-MB HEIGHT FIELD.
Final rept.,
Michigan Univ., Ann Arbor. Dept. of Meteorology and Oceanography.
Christopher M. Hayden, and Aksel C. Wiin-Nielsen. Feb 68, 158p
Contract Cwb-11377

Descriptors: (*Meteorological satellites, Aerial photographs), (*Aerial photographs, *Air mass analysis), Clouds, Visibility, Feasibility studies, Weather forecasting, Density, Weather stations, Reflection, Tables, Maps, Statistical analysis, Cloud cover.

The study was conducted to investigate the feasibility of modifying the 500 mb height field by reference to cloud formations visible in satellite photographs. Three case studies are investigated to illustrate high (North America), medium (Atlantic), low (Pacific) data density regions. It is demonstrated that the tendency technique is successful in improving the forecast guess field, though modestly in areas of good data. (Author)
PB-177 880 HC$3.00 MF$0.65

BUILDUP INDEX AS AN EXPRESSION OF MOISTURE CONTENT IN DUFF.
North Central Forest Experiment Station, St. Paul, Minn.
For primary bibliographic entry see Field 2F.
PB-178 013 HC$3.00 MF$0.65

MEASUREMENT OF DRAFT SPEEDS IN CONVECTIVE CLOUDS BY MEANS OF PULSED-DOPPLER RADAR,
Arizona Univ., Tucson. Inst. of Atmospheric Physics.
For primary bibliographic entry see Field 17I.
PB-178 016 HC$3.00 MF$0.65

5. BEHAVIORAL AND SOCIAL SCIENCES

5A. Administration and Management

THE ROLE AND CAREER DEVELOPMENT OF THE SCIENTIFIC AND ENGINEERING OFFICER IN THE AIR FORCE,
Stanford Research Inst Menlo Park Calif
For primary bibliographic entry see Field 5I.
AD-668 077 HC$3.00 MF$0.65

GENERAL SERVICES ADMINISTRATION FEDERAL SUPPLY SERVICE,
General Services Administration Washington D C
For primary bibliographic entry see Field 15E.
AD-668 228 HC$3.00 MF$0.65

MULTI-DIMENSIONAL AND DYNAMIC ASSIGNMENT MODELS WITH SOME REMARKS ON ORGANIZATION DESIGN.
Carnegie-Mellon Univ Pittsburgh Pa Management Sciences Research Group
For primary bibliographic entry see Field 5I.
AD-668 326 HC$3.00 MF$0.65

EFFECTIVE USE OF FEDERAL LABORATORIES.
Management analysis memo.,
Office of the Director of Defense Research and Engineering Washington D C Office for Lab Management
Donald M. MacArthur. 2 Apr 68, 31p Rept no. ODDRE-MAM-68-6

Descriptors: (*Laboratories, Effectiveness), (*Management engineering, Laboratories), Cost effectiveness, United States Government, Scientific research, Federal budgets, Personnel management, National defense.
Identifiers: *Federal laboratories, Technology.

In the general discussion on how to make the best use of existing Federal laboratories, the following issues are explored: how to use or redirect a laboratory's capabilities when it essentially has completed its assigned mission; what policies or procedures foster or hinder an agency of Government making use of the capabilities existing in a laboratory funded by another agency; how can, or should, mission-oriented laboratories be responsive to national problems -- such as transportation, housing or crime -- in which they may have a capability; to what extent should laboratory directors have funds available to respond to new areas of opportunity, and what guidelines are there to determine if new laboratories should be created to respond to new missions or if the job can be handled within existing laboratories. (Author)
AD-668 344 HC$3.00 MF$0.65

AUTOMATED CURTS HF: REAL-TIME MANAGEMENT AND ADMINISTRATION OF HF SYSTEMS AND FREQUENCY RESOURCES.
Stanford Research Inst Menlo Park Calif
For primary bibliographic entry see Field 17B.
AD-668 347 HC$3.00 MF$0.65

METHOD AND SUBSTANCE IN CHANGE.
Research rept.,
Carnegie-Mellon Univ Pittsburgh Pa Management Sciences Research Group
A. Charnes, and W. W. Cooper. Mar 68, 16p
Rept no. RR-129
Contract Nonr-760 (24)

AN EVALUATION OF THE OPERATIONAL UTILITY OF DIRECT READOUT INFRARED SATELLITE DATA.
Technical rept.,
Air Weather Service Scott AFB Ill
Serhij Pilipowskyi. Mar 68, 21p Rept no. AWS-TR-199

Descriptors: (*Meteorological satellites, *Infrared equipment), (*Weather forecasting, Early warning systems), Infrared scanning, Radiometers, Meteorological parameters, Electronic recording systems, Accuracy, Orbital trajectories, Periodic variations, Resolution, Cloud cover, Storms, Atmospheric temperature, Effectiveness.
Identifiers: Nimbus 1 satellite, Nimbus 2 satellite, Summer (Season).

The study attempts to answer the question of the utility of direct-readout infrared data on the basis of data obtained from the Nimbus I and II spacecraft. Both spacecraft provided infrared data to a central readout station of the National Aeronautics and Space Administration. The high-resolution infrared data (HRIR) was recorded on 70mm film and is of photographic quality. The data sample is limited to September of 1964 and May thru November of 1966, the operating lifetimes of these infrared systems. A large number of HRIR pictures were available for this evaluation, as well as several DRIR data samples. The DRIR pictures were obtained from the Joint Typhoon Warning Center (JTWC) at Guam where a Navy APT set had been modified to receive DRIR data. Additional input into this study came from an evaluation of DRIR by the US Navy, from a large number of technical publications on this subject, and from personal contact with those who had worked with DRIR data. (Author)
AD-668 125 HC$3.00 MF$0.65

AIR LAUNCHED BALLISTIC RADIOSONDE DISPENSER EQUIPMENT F 3 TYPE: DESCRIPTION AND INSTRUCTIONS FOR USE.
Sprenger (Albin) Sankt Andreasberg (West Germany)
Jul 58, 78p
Contract AF 61 (514)-969
See also AD-668 210.

Descriptors: (*Radiosondes, Air drop operations), (*External stores, Radiosondes), Launching, Control panels, Telemeter systems, Recording systems, Instrumentation, Jet training planes, Instruction manuals, West Germany, Air-to-surface.
Identifiers: *Ballistic radiosondes, K-55 radiosondes, F-3 dispensers, T-33 aircraft.

The document contains the description and the instructions for use of the Radiosonde Dispenser Pod F-3 type and its accessories as control panel and play back unit. The Radiosonde Dispenser Pod is to be fastened to the Jato bottle lugs on the underside of the fuselage of an aircraft, specially of the T-33 type. The control panel for remote control of the dropsonde release and of the recorder of the sonde signals is to be mounted on a convenient place inside the cockpit of the aircraft. A 15-core cable fits the radiosonde dispenser with electric power from the aircraft 28 volts electrical system and contains the wires which are necessary for controlling and indicating the proceedings inside the dispenser pod. The play back unit is to be installed in a room on the ground where evaluating of the dropsonde data takes place. (Author)
AD-668 209 HC$3.00 MF$0.65

TECHNICAL DESCRIPTION AND SERVICE INSTRUCTION FOR AIR LAUNCHED BALLISTIC RADIOSONDE K 55 - E.
Graw (Josef) Messgeraete G M B H Nurenberg (West Germany)
18 Apr 58, 48p
Contract AF 61 (514)-969
See also AD-668 210.

Descriptors: (*Radiosondes, Air drop operations), Telemeter systems, Recording systems, Barometers, Thermometers, Hygrometers, Power supplies, Calibration, Maintenance, Instruction manuals, West Germany, Air-to-surface.
Identifiers: *Ballistic radiosondes, K-55 radiosondes.

Radiosonde K 55 is an instrument used for meteorological measuring of the free atmosphere. An airplane flying in 50,000 feet altitude with high speed (500 kn) launches a radiosonde every 110 miles approx. The radiosonde descends very fastly thus reaching the sea level before the next one is released. During the descent the radiosonde measures the meteorological values: barometric pressure, relative humidity and atmospheric temperature; same are transmitted as Morse code impulse values. These Morse code signals are received in the airplane and taken up by a wire record. After launching all radiosondes the airplane returns to the airfield (ground station); there the wire records are plaid off and evaluated. For quicker evaluation of the measurements the Morse code signals of the radiosonde may also be transmitted to the ground station by a high-powered relay transmitter. (Author)
AD-668 210 HC$3.00 MF$0.65

THE EFFECT OF VARIABLE CORIOLIS PARAMETER IN A PLANETARY-CIRCULATION GENERATED BY A TWO-PARAMETER QUASI-GEOSTROPHIC MODEL,
Hebrew Univ Jerusalem (Israel)
Abraham Huss. Sep 64, 6p
Contract AF 19 (604)-4963, Grant AF-EOAR-108-63
Research supported in part by National Science Foundation, Grant NSF-G14698.
Availability: Published in Journal of the Atmospheric Sciences, v21 n5 p507-12 September 1964.

Descriptors: (*Atmospheric motion, Atmosphere models), (*Atmosphere models, Coriolis effect), Perturbation theory, Atmospheric temperature, Jet streams (Meteorology), Mathematical prediction, Barometric pressure, Wind.
Identifiers: Computer analysis.

The governing equations of a two-level quasigeostrophic model were integrated twice for periods of about 10 days, once including variation of the Coriolis parameter (the beta term) and once excluding it. As expected, the exclusion of the beta-term resulted in a quicker rate of development. The evolving perturbation had almost the same pattern in the two cases, but the final distribution of the mean zonal winds was different. In the beta= 0 case the zonal velocities in the central region tended towards a barotropic pattern, while a baroclinic jet was formed in the case where beta was not equal to zero. The numerical integration is also compared with linear theory. (Author)
AD-668 273 Not available from CFSTI.

DISTRIBUTION AND DIMENSIONS OF CLOUD COVER AT ALTITUDES ABOVE 20,000 FEET.
Final rept.,
Lockheed Missiles and Space Co Sunnyvale Calif
R. H. Blackmer, Jr. May 64, 50p
Contract AF 04 (647)-787
Prepared in cooperation with Stanford Research Inst., Menlo Park, Calif. Proj. SRI-4649.

Descriptors: (*Cloud cover, Distribution), Thunderstorms, High altitude, Meteorological parameters, Radiosondes, Tropopause, Cirrus clouds, Radar echo areas, Penetration, Aerial photographs, Aerial reconnaissance.
Identifiers: U-2 aircraft.

The research described in this Final Report is directed toward finding methods of specifying the most probable distribution of cloud-top altitudes within areas where high-altitude clouds are likely to exist. During a nine-month period, three cases were studied utilizing cloud photographs from U-2 aircraft and pertinent concurrent meteorological data. The cloud photographs were analyzed by methods developed at Stanford Research Institute to determine the dimensions and distributions of clouds above 20,000 ft. Meteorological data--such as hourly cloud observations, six-hourly synoptic charts, twelve-hourly radiosonde ascents, and hourly summaries of radar echoes--were analyzed to determine the state of the atmosphere as well as time changes in atmospheric conditions related to cloud cover. Maximum cloud tops were found to penetrate the tropopause by as much as 10,000 ft and radar echo penetrations of 15,000 ft were noted in moist tropical air. (Author)
AD-668 314 HC$3.00 MF$0.65

THE OPERATIONAL DISSIPATION OF SUPERCOOLED FOG: PROJECT COLD COWL 1967-1968.
Technical rept.,
Air Weather Service Scott AFB Ill
Herbert S. Appleman. Apr 68, 16p Rept no. AWS-TR-205

Descriptors: (*Fog, Removal), (*Weather, *Control systems), All-weather aviation, Take-off, Aircraft landings, Airfields, Military facilities, Clouds, Carbon dioxide, Silver compounds, Alaska, Iodides, Meteorological phenomena, Transport planes, Particle size, Test methods, Ice fog.
Identifiers: Cold Cowl project, C-130 aircraft, WC-130E aircraft, *Weather modification, Seedants, Dry ice, Cloud seeding.

In the winter of 1967-1968, the Air Weather Service (AWS) carried out its first operational weather-modification program at Elmendorf AFB. An AWS weather-reconnaissance aircraft (WC-130E) was used to seed supercooled fog with dry ice. A prescribed flight path was flown a specified distance upwind from the target area, and crushed dry ice disseminated at rates of 12.5 or 25 pounds per mile. It was found that a clearing generally occurred in 30 to 45 minutes. The only real failure occurred in a case that may have been an ice fog; in addition, proper positioning of the hole proved a major problem throughout the program. Despite these difficulties, an estimated 200 successful take-offs and landings were made using the artificially produced clearings. Supplemental tests were carried out using airborne liquid CO_2 dispensers and silver iodide pyrotechnics. (Author)
AD-668 439 HC$3.00 MF$0.65

BIBLIOGRAPHY ON THE CLIMATE OF CHILE.
Environmental Science Services Administration, Silver Spring, Md.
1967, 22p WB/BC-12, PB-176732

Descriptors: *Bibliographies, *Chile, *Climate, Meteorology, Rain, South america, Thunderstorms, Weather forecasting, Wind variations.

For abstract, see STAR 06 10.
N68-19509 HC$3.00 MF$0.65

OBSERVATION AND ANALYSIS OF THE SURFACE WIND OVER THE OCEAN.
Koninklijk Nederlands Meteorologisch Instituut, the Hague.
G. Verploegh. 1967, 60p REPT.-89
1967 Coll- 60 P Refs

Descriptors: *Gust loads, *Oceans, *Wind profiles, Gusts, Meteorological charts, Oceanography, Surface waves, Velocity distribution, Wind (meteorology), Wind measurement, Wind pressure.

For abstract, see STAR 06 10.
N68-19679 HC$3.00 MF$0.65

INVESTIGATION OF METEOROLOGICAL AND IONOSPHERIC CONDITIONS OF THE OCCURRENCE OF NOCTILUCENT CLOUDS IN SIBERIA.

K Izucheniyu Meteorologicheskikh I Ionosfernykh Usloviy Poyavleniya Serebristykh Oblakov S Sibiri
Scripta Technica, Inc., Washington, D. C.
N. N. Fast. Mar 68, 6p NASA-TT-F-11525
Contract NASW-1694
Coll- 6 P Refs Tran- Transl. Into English From Meteorol. Issled. (Moscow), No. 12, 1966 P 106-110

Descriptors: *Ionospheric composition, *Noctilucent clouds, *Siberia, *Statistical analysis, *Synoptic meteorology, Luminescence, U.S.S.R..

For abstract, see STAR 06 10.
N68-19753 HC$3.00 MF$0.65

CLIMATOLOGY OF AMSTERDAM AIRPORT (SCHIPHOL).
Koninklijk Nederlands Meteorologisch Instituut, the Hague.
1966, 145p REPT.-87
1966 Coll- 145 P

Descriptors: *Climatology, *Humidity, *Netherlands, *Visibility, *Wind (meteorology), Clouds (meteorology), Precipitation (meteorology), Tables (data).

For abstract, see STAR 06 10.
N68-19772 HC$3.00 MF$0.65

THE SOUTHERN OSCILLATION AND WORLD WEATHER.
de Zuidelijke Schommeling en Haar Mondiale Uitbreiding
Koninklijk Nederlands Meteorologisch Instituut, the Hague.
H. P. Berlage. 1966, 148p REPT.-88

Descriptors: *Meteorology, *Oceanography, *Southern hemisphere, Asia, Indian ocean, Oscillations, Peru, Variations.

For abstract, see STAR 06 10.
N68-19855 HC$3.00 MF$0.65

AIRBORNE INSTRUMENTATION FOR A CLOUD PHYSICS RESEARCH PROJECT.
National Research Council of Canada, Ottawa (Ontario).
K. G. Pettit. Oct 67, 77p NRC-9978, LR-490

Descriptors: *Cloud seeding, *Meteorological instruments, *Rain, *Weather modification, Airborne equipment, Cloud physics, Precipitation (meteorology), Rain gages, Silver iodides.

For abstract, see STAR 06 10.
N68-19869 HC$3.00 MF$0.65

WIND AND WAVE DATA OF NETHERLANDS LIGHT VESSELS SINCE 1949.
Wind- en Golfgegevens Van Nederlandse Lichtschepen Sinds 1949
Koninklijk Nederlands Meteorologisch Instituut, the Hague.
R. Dorrestein. 1967, 119p REPT.-90
1967 Coll- 119 P Refs

Descriptors: *Ships, *Tables (data), *Water waves, *Wind measurement, Meteorology, Netherlands, Northern hemisphere, Oceanography, Wind profiles.

For abstract, see STAR 06 10.
N68-19888 HC$3.00 MF$0.65

METEOROLOGICAL SATELLITE DATA, PART 2 FINAL REPORT, MAR. 1966 - JUN. 1967.
Hebrew Univ., Jerusalem (Israel). Dept. of Meteorology.
J. Neumann. Jul 67, 37p PB-177066
Contract CWB-11055
Prep- Prepared in Cooperation With Israel Min. of Transport and Commun. Meteorol. Serv.

Descriptors: *Cloud cover, *Israel, *Lee waves, *Mountains, *Satellite observation, *Statistical weather forecasting, Air masses, Clouds (meteorology), Jet streams (meteorology), Meteorological satellites, Moisture content, Photointerpretation.

For abstract, see STAR 06 10.
N68-20234 HC$3.00 MF$0.65

SCALAR AND COMPONENT WIND CORRELATIONS BETWEEN ALTITUDE LEVELS FOR CAPE KENNEDY, FLORIDA, AND SANTA MONICA, CALIFORNIA.
National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
G. E. Daniels, and O. E. Smith. Apr 68, 118p
NASA-TN-D-3815
Contract 124-12-03-00-62

Descriptors: *California, *Correlation coefficients, *Florida, *Wind profiles, Cape kennedy launch complex, Data processing, Mathematical models, Spacecraft design, Statistical analysis, Statistical distributions, Vertical distribution, Wind measurement, Wind velocity.

For abstract, see STAR 06 10.
N68-20278 HC$3.00 MF$0.65

INVESTIGATION OF AIR-FLOW VELOCITY BY LASER BACKSCATTER.
National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
K. R. Bourquin, and F. H. Shigemoto. Apr 68, 23p
NASA-TN-D-4453
Contract 125-22-02-02-00-21

Descriptors: *Backscattering, *Clear air turbulence, *Laser modes, *Light scattering, Air flow, Airborne equipment, Flow visualization, Hot-wire anemometers, Scatter propagation, Velocity distribution.

For abstract, see STAR 06 10.
N68-20375 HC$3.00 MF$0.65

THE UTILITY OF SATELLITE CLOUD PHOTOGRAPHS IN OBJECTIVE ANALYSIS OF THE 500-MB HEIGHT FIELD.
Final rept.,
Michigan Univ., Ann Arbor. Dept. of Meteorology and Oceanography.
Christopher M. Hayden, and Aksel C. Wiin-Nielsen. Feb 68, 158p
Contract Cwb-11377

Descriptors: (*Meteorological satellites, Aerial photographs), (*Aerial photographs, *Air mass analysis), Clouds, Visibility, Feasibility studies, Weather forecasting, Density, Weather stations, Reflection, Tables, Maps, Statistical analysis, Cloud cover.

The study was conducted to investigate the feasibility of modifying the 500 mb height field by reference to cloud formations visible in satellite photographs. Three case studies are investigated to illustrate high (North America), medium (Atlantic), low (Pacific) data density regions. It is demonstrated that the tendency technique is successful in improving the forecast guess field, though modestly in areas of good data. (Author)
PB-177 880 HC$3.00 MF$0.65

BUILDUP INDEX AS AN EXPRESSION OF MOISTURE CONTENT IN DUFF.
North Central Forest Experiment Station, St. Paul, Minn.
For primary bibliographic entry see Field 2F.
PB-178 013 HC$3.00 MF$0.65

MEASUREMENT OF DRAFT SPEEDS IN CONVECTIVE CLOUDS BY MEANS OF PULSED-DOPPLER RADAR,
Arizona Univ., Tucson. Inst. of Atmospheric Physics.
For primary bibliographic entry see Field 17I.
PB-178 016 HC$3.00 MF$0.65

5. BEHAVIORAL AND SOCIAL SCIENCES

5A. Administration and Management

THE ROLE AND CAREER DEVELOPMENT OF THE SCIENTIFIC AND ENGINEERING OFFICER IN THE AIR FORCE,
Stanford Research Inst Menlo Park Calif
For primary bibliographic entry see Field 5I.
AD-668 077 HC$3.00 MF$0.65

GENERAL SERVICES ADMINISTRATION FEDERAL SUPPLY SERVICE,
General Services Administration Washington D C
For primary bibliographic entry see Field 15E.
AD-668 228 HC$3.00 MF$0.65

MULTI-DIMENSIONAL AND DYNAMIC ASSIGNMENT MODELS WITH SOME REMARKS ON ORGANIZATION DESIGN.
Carnegie-Mellon Univ Pittsburgh Pa Management Sciences Research Group
For primary bibliographic entry see Field 5I.
AD-668 326 HC$3.00 MF$0.65

EFFECTIVE USE OF FEDERAL LABORATORIES.
Management analysis memo.,
Office of the Director of Defense Research and Engineering Washington D C Office for Lab Management
Donald M. MacArthur. 2 Apr 68, 31p Rept no. ODDRE-MAM-68-6

Descriptors: (*Laboratories, Effectiveness), (*Management engineering, Laboratories), Cost effectiveness, United States Government, Scientific research, Federal budgets, Personnel management, National defense.
Identifiers: *Federal laboratories, Technology.

In the general discussion on how to make the best use of existing Federal laboratories, the following issues are explored: how to use or redirect a laboratory's capabilities when it essentially has completed its assigned mission; what policies or procedures foster or hinder an agency of Government making use of the capabilities existing in a laboratory funded by another agency; how can, or should, mission-oriented laboratories be responsive to national problems -- such as transportation, housing or crime -- in which they may have a capability; to what extent should laboratory directors have funds available to respond to new areas of opportunity, and what guidelines are there to determine if new laboratories should be created to respond to new missions or if the job can be handled within existing laboratories. (Author)
AD-668 344 HC$3.00 MF$0.65

AUTOMATED CURTS HF: REAL-TIME MANAGEMENT AND ADMINISTRATION OF HF SYSTEMS AND FREQUENCY RESOURCES.
Stanford Research Inst Menlo Park Calif
For primary bibliographic entry see Field 17B.
AD-668 347 HC$3.00 MF$0.65

METHOD AND SUBSTANCE IN CHANGE.
Research rept.,
Carnegie-Mellon Univ Pittsburgh Pa Management Sciences Research Group
A. Charnes, and W. W. Cooper. Mar 68, 16p Rept no. RR-129
Contract Nonr-760 (24)

Prepared in cooperation with Northwestern Univ., Evanston. Systems Research Group, Contract Nonr-1228 (10), Proj. NR-047-021, Systems research memo., SRM-194.

Descriptors: (*Industrial relations, Attitudes), Management engineering, Employee relations, Social psychology, Social sciences, Interactions, Predictions, Behavior.

Methodological and substantive progress or alteration are here distinguished in order to assess their likely effects in management, art and science especially when, as at present, methodological changes are occurring at an increasing pace. This can bring confusion in its train along with a feeling of loss of identity and a search for new orientations (values) as a result of altering the relations of persons to each other, to their jobs and their environment which generally accompany such fast-paced changes in methodology. (Author)
AD-668 488 HC$3.00 MF$0.65

CPM AND DCPM UNDER RISK.
Carnegie Inst of Tech Pittsburgh Pa Management Sciences Research Group
For primary bibliographic entry see Field 12B.
AD-668 490 HC$3.00 MF$0.65

NORMATIVE ACCOUNTING THEORY AND THE THEORY OF DECISION.
California Univ Los Angeles Western Management Science Inst
Nils H. Hakansson. Jan 68, 27p Rept no. WMSI Working Paper-131
Contract Nonr-233 (75)

Descriptors: (*Management planning, Money), (*Decision theory, Economics), Social sciences, Optimization, Probability, Uncertainty, Mathematical programming, Sequential analysis, Mathematical models.
Identifiers: *Accounting theory.

The paper discusses an approach to the construction of normative accounting theory with respect to both methodology and substance. The method of postulation and deduction is outlined, with particular emphasis on its role in the social sciences in general and in accounting in particular. It is suggested that a formal link must be established between the (normative) theory of decision and accounting, and that rigorous (economic) theories of the individual and of the firm must be developed, if necessary by accountants, before accounting theories can be built on sound foundations. (Author)
AD-668 495 HC$3.00 MF$0.65

ECONOMICS OF INQUIRING, COMMUNICATIONS, DECIDING,
California Univ Los Angeles Western Management Science Inst
Jacob Marschak. Jan 68, 36p Rept no. WMSI-Working Paper-134
Contract Nonr-233 (75)
Based on the Richard T. Ely Lecture delivered at the American Economic Association session of 28 Dec 67.

Descriptors: (*Management planning, Decision making), (*Decision making, Economics), Probability, Uncertainty, Information theory, Coding, Costs, Problem solving, Data processing systems.

The demand price of various 'informational' (i.e., symbol-manipulating rather than matter-transforming or matter-transporting) instruments or services depends on the expected payoff they can earn for their users. Certain statistical characteristics such as Blackwell's 'informativeness' of inquiries and Shannon's 'capacity' of a transmission channel are examined as to their effect on the payoff to a given user; and the special character of the underlying assumptions is pointed out. As regards the supply price, and thus the cost, of informational services (i.e., of inquiry, coding, transmitting, deciding), a sketch is made of the current incomplete knowledge of comparative advantages of men vs. machines with respect to particular kinds of services; and of certain economies of mass production. An understanding of the factors determining the demand, the supply, and the market prices of informational services is needed for any discussion of the welfare economics of information, and thus of economic policies relevant to education and research. (Author)
AD-668 496 HC$3.00 MF$0.65

THE ADMINISTRATION OF RESEARCH. AN INTERPRETIVE SUMMARY OF THE PROCEEDINGS OF THE NATIONAL CONFERENCE ON THE ADMINISTRATION OF RESEARCH, 1947-1964.
Delaware Univ., Newark.
S. E. Clark, and L. B. Williams. 1966, 171p
NASA-CR-93723
Contract NSR-08-001-010

Descriptors: *Conferences, *Management planning, *Project management, *Research, Governments, Industries, Organizations, Universities.

For abstract, see STAR 06 10.
N68-19693 HC$3.00 MF$0.65

ANNUAL REPORT, JULY 1, 1966-JUNE 30, 1967.
Northern Wisconsin Development Center, Wausau.
For primary bibliographic entry see Field 5C.
PB-177 404 HC$3.00 MF$0.65

THE STRUCTURE OF RELATED INSTRUCTION IN WISCONSIN APPRENTICESHIP PROGRAMS.
Wisconsin Univ., Madison.
For primary bibliographic entry see Field 5I.
PB-177 567 HC$3.00 MF$0.65

AN INFORMATION SYSTEM DEVELOPMENT PROGRAM.
CONSAD Research Corp., Pittsburgh, Pa.
For primary bibliographic entry see Field 5B.
PB-177 809 HC$3.00 MF$0.65

MID-AMERICA INDUSTRIAL DISTRICT PRYOR, OKLAHOMA. VOLUME I. GENERAL DEVELOPMENT PLAN.
Hudgins, Thompson, Ball and Associates, Inc., Oklahoma City, Okla.
For primary bibliographic entry see Field 5C.
PB-177 885 HC$3.00 MF$0.65

GENERAL DEVELOPMENT PLAN MID-AMERICA INDUSTRIAL DISTRICT PRYOR, OKLAHOMA. VOLUME 2. APPENDIX.
Hudgins, Thompson, Ball and Associates, Inc., Oklahoma City, Okla.
For primary bibliographic entry see Field 5I.
PB-177 886 HC$3.00 MF$0.65

MANAGEMENT DEVELOPMENT. VOLUME I,
Agency for International Development, Washington, D. C. Communications Resources Div.
Ellis O. Keller. 1962, 244p
A series of lectures and articles. Prepared in cooperation with Pennsylvania State Univ., University Park.

Descriptors: (*Management engineering, Handbooks), Industrial relations, Personnel management, Job analysis, Social communication, Reports, Personnel, Selection, Industrial psychology.

Contents: Management philosophy and policies; The concept of management; The art of managing; Delegation and accountability; Management communication; Reports that can be understood; Selection and induction; The counseling interview; The management audit.
PB-177 913 HC$3.00 MF$0.65

MACHINERY MANUFACTURING COST ACCOUNTING.
International Cooperation Administration, Washington, D. C. Office of Industrial Resources.
1961, 64p Technical Bull-46
Prepared in cooperation with International Harvester Co., Chicago, Ill.

Descriptors: (*Management engineering, *Machine tool industry), Costs, Money, Budgets, Industrial training, Wages, Analysis, Materials, Machine shop practice, Management control systems, Instruction manuals.
Identifiers: Cost accounting.

Contents: Hints for the conference leader; We need manufacturing accounts; General problem and material cost; Labor costs are important; Labor and other costs; Subdivision of cost accounts; Analyzing the summary operating statement; Departmental budgets; and Locally designated sub-accounts.
PB-177 950 HC$3.00 MF$0.65

DEPARTMENTAL PERSONNEL PROCEDURES.
Agency for International Development, Washington, D. C. Communications Resources Div.
Dec 57, 46p Technical Bull-51
Prepared in cooperation wit ' International Harvester Co., Chicago, Ill.

Descriptors: (*Management engineering, Personnel), Recruiting, Employment, Research program administration, Management planning, Management control systems, Performance (Human), Instruction manuals, Stimulation, Supervisory personnel.

Contents: The supervisor and employment; How to get a new employe; The new employe on the job; Control of absenteeism; Procedures for transfers; Seniority, vacation eligibility, lay-offs; Terminations; and Summary and review.
PB-177 951 HC$3.00 MF$0.65

TRAINING COURSE IN COST ACCOUNTING.
Agency for International Development, Washington, D. C. Communications Resources Div.
1962, 69p Technical Bull-59
Prepared in cooperation with Andrews (George H.) Engineering Associates, Washington, D. C.

Descriptors: (*Management planning, Money), Industrial training, Costs, Training devices, Industrial training, Industries, Management control systems, Instruction manuals, Economics.
Identifiers: Cost accounting.

Contents: Introduction, general cost accounting classifications, direct manufacturing costs, direct materials; Direct labor, summary of direct manufacturing costs, review questions; Manufacturing overhead, depreciation of fixed assets; Indirect labor, supplies; Utilities, Unforeseen expense, summary of total manufacturing overhead; Administrative cost, sales cost, total cost of operations; Gross sales price and profit; Cost of production of single items; A summary of cost accounting methods, checking cost accounts, application of the method and procedures; and Cost accounting blank forms.
PB-177 953 HC$3.00 MF$0.65

COST CONTROL ACCOUNTING.
Agency for International Development, Washington, D. C. Communications Resources Div.
1962, 78p Technical Bull-60
Prepared in cooperation with Andrews (George H.) Engineering Associates, Inc., Washington, D. C.

Descriptors: (*Management planning, Money), Costs, Training devices, Industrial training, Industries, Management control systems, Instruction manuals.
Identifiers: Cost accounting.

Contents: Review of cost accounting procedures; Book accounts; Book accounts for cost control;

The purchase requisition; The voucher check; The petty cash voucher; The monthly report; Review and application; and Cost control in action.
PB-177 954 HC$3.00 MF$0.65

SALES PROMOTION METHODS,
International Cooperation Administration, Washington, D. C. Technical Aids Branch.
George H. Andrews. 1962, 66p Training Manual-103
Prepared in cooperation with Andrews Engineering Associates, Inc., Washington, D. C.

Descriptors: (*Management engineering, *Commerce), Catalogs, Display systems, Public relations, Management planning, Professional personnel, Instruction manuals.
Identifiers: Sales promotion, Salesmen.

Contents: What is sales promotion; The scope of sales promotion; A salesman's tools; Window and interior displays; Direct mail advertising; Catalogs and price lists; Advertising specialties, premiums, and contents; and Coordination - key to successful sales promotion.
PB-177 967 HC$3.00 MF$0.65

TIME STUDY PRACTICE AND PROCEDURE.
Agency for International Development, Washington, D. C. Communications Resources Div.
1962, 55p Training Manual-111

Descriptors: (*Management engineering, *Time studies), Analysis, Instruction manuals, Management control systems, Industrial training, Training devices, Philippines.

Contents: Statements of policy; Responsibilities of a time study engineer; Fundamentals of time study; The time study operation; and Calculating the time study.
PB-177 969 HC$3.00 MF$0.65

PERSONNEL MANAGEMENT. WAGE AND SALARY ADMINISTRATION (PART C. CONFERENCE LEADER'S GUIDE).
Agency for International Development, Washington, D. C. Communications Resources Div.
1962, 28p Training Manual-130
Prepared in cooperation with Industrial Development Center, Manila.

Descriptors: (*Management engineering, *Personnel), Standards, Wages, Labor, Management planning, Job analysis, Research program administration, Management control systems, Production, Measurement, Instruction manuals, Stimulation.
Identifiers: Job incentives.

Contents: Introduction to wage and salary administration; Fundamentals of job evaluation; Conversion of job evaluation data; Job standardization and work measurement; Compensation methods; Incentive plans; Incentives for indirect labor; Compensating managerial personnel; Merit rating; and Wage and salary administration controls.
PB-177 976 HC$3.00 MF$0.65

PERSONNEL MANAGEMENT. PERSONNEL RECORDS AND STATISTICS.
Agency for International Development, Washington, D. C. Communications Resources Div.
1962, 122p Training Manual-131
Prepared in cooperation with Industrial Development Center, Manila.

Descriptors: (*Management engineering, Personnel), Manpower studies, Procurement, Training devices, Management planning, Instruction manuals, Philippines.

Contents: Manpower procurement; Manpower utilization; Indices of personnel problems; Manpower planning; and Manpower audit.
PB-177 977 HC$3.00 MF$0.65

PERFORMANCE DISCUSSIONS.
Agency for International Development, Washington, D. C. Communications Resources Div.
1961, 32p Training Manual-135
Prepared in cooperation with Shell Oil Co., Tulsa, Okla. Personnel and Industrial Relations Dept.

Descriptors: (*Management engineering, Instruction manuals), (*Performance (Human), Technicians), Employment, Industrial training, Symposia, Manpower studies, Classification.

Contents: Employee performance evaluations; Interviewing techniques; Conducting a discussion; and Examples of employee types.
PB-177 979 HC$3.00 MF$0.65

ECONOMICS OF INDUSTRIAL DEVELOPMENT,
Agency for International Development, Washington, D. C. Communications Resources Div.
For primary bibliographic entry see Field 5C.
PB-177 983 HC$3.00 MF$0.65

EDUCATION AND THE FEDERAL LABORATORIES: AN ASSESSMENT OF FEDERAL LABORATORY EDUCATIONAL ACTIVITIES AND THEIR PRESENT AND POTENTIAL RELATIONSHIPS WITH UNIVERSITIES.
Federal Council for Science and Technology, Washington, D. C. Committee on Federal Labs.
For primary bibliographic entry see Field 5K.
PB-178 018 HC$3.00 MF$0.65

5B. Documentation and Information Technology

U. S. ARMY HANDBOOK OF COUNTERINSURGENCY GUIDELINES FOR AREA COMMANDERS: AN ANALYSIS OF CRITERIA,
American Univ., Washington, D. C. Special Operations Research Office.
For primary bibliographic entry see Field 15G.
AD-478 301 HC$3.00 MF$0.65

ON-LINE ANALYSIS FOR SOCIAL SCIENTISTS.
Massachusetts Inst of Tech Cambridge
For primary bibliographic entry see Field 5K.
AD-668 009 HC$3.00 MF$0.65

R AND D ABSTRACTS. VOLUME 20 NUMBER 23, 1-15 DECEMBER 1967.
Ministry of Technology London (England) Technical Information and Library Services
1967, 57p
See also AD-667 182.

Descriptors: (*Reports, *Abstracts), Operations research, Biology, Medicine, Mathematics, Data processing systems, Astronomy, Mapping, Meteorology, Fluid mechanics, Aerodynamics, Plasma physics, Acoustics, Thermodynamics, Chemistry, Electricity, Electromagnetism, Electronic equipment, Engines + motors, Materials, Metallurgy.
Identifiers: Announcement bulletins.
AD-668 033 HC$3.00 MF$0.65

SELECTIVE DISSEMINATION OF INFORMATION IN PRACTICE. SURVEY OF OPERATIONAL AND EXPERIMENTAL SDI SYSTEMS,
Office of Aerospace Research Arlington Va
A. G. Hoshovsky, and C. S. Downie. 21 Sep 67, 19p Rept no. OAR-67-0012
Prepared for presentation at the Congress of the International Federation on Documentation (FID) (1967) Tokyo, Japan, 21 Sep 67.

Descriptors: (*Documentation, Dissemination), Technical information centers, Information retrieval, Reports, Selection, Scientific personnel, Costs, Engineering personnel, Effectiveness, Reviews.
Identifiers: *Selective dissemination of information, SDI (Selective Dissemination of Information), CAST (Clearinghouse Announcement in Science and Technology).

The primary purpose of the report is to present an overview of the operational and experimental systems established for the selective dissemination of scientific and technical information. Secondarily an attempt was made to identify the trends which may shape the future development of the selective dissemination procedures. The report is based in part on the existing SDI literature and in part on the results of two recent surveys. The combined results indicate that there are approximately 45 SDI systems in various stages of operation, serving an approximate population of 30,000 users. The largest system processes as many as 30,000 entries per month, while the smallest runs no more than 150. AEC, NASA and DOD are the three largest processors. Operating costs are in the vicinity of $100 per user per year. The user satisfaction is high. This satisfaction correlates positively with the degree of literature coverage. There seems to be no correlation with the precision of matching. The observable trends are toward the efforts of capitalizing on products from large systems, toward an increased use of group profiles and toward commercial subscription services. (Author)
AD-668 072 HC$3.00 MF$0.65

STEPS TOWARD A GENERAL PURPOSE TIME-SHARING SYSTEM USING LARGE CAPACITY CORE STORAGE AND TSS/360,
Carnegie-Mellon Univ Pittsburgh Pa Dept of Computer Science
For primary bibliographic entry see Field 9B.
AD-668 078 HC$3.00 MF$0.65

CLEAR AIR TURBULENCE MEETING, 26-27 APRIL 1965, SPONSORED BY: UNITED STATES AIRFORCE.
Department of the Air Force Washington D C
For primary bibliographic entry see Field 4A.
AD-668 080 HC$3.00 MF$0.65

VIBROMETRY,
Foreign Technology Div Wright-Patterson AFB Ohio
For primary bibliographic entry see Field 20K.
AD-668 226 HC$3.00 MF$0.65

QUARTERLY REPORT OF TECHNICAL PROGRESS (11TH),
Martin Marietta Corp Denver Colo Center for High Energy Forming
For primary bibliographic entry see Field 13H.
AD-668 243 HC$3.00 MF$0.65

THE SHOCK AND VIBRATION BULLETIN.
Shock and Vibration Information Center (Defense) Washington D C
For primary bibliographic entry see Field 20K.
AD-668 246 HC$3.00 MF$0.65

THE POTENTIAL USE OF MATHEMATICAL MODELS IN MATERIALS DATA PRESENTATION WITH PARTICULAR REFERENCE TO THE AGARD MATERIAL PROPERTIES HANDBOOKS,
Advisory Group for Aerospace Research and Development Paris (France)
For primary bibliographic entry see Field 14B.
AD-668 254 HC$3.00 MF$0.65

BIOLOGICAL PRINCIPLES OF INFORMATION STORAGE AND RETRIEVAL,
Illinois Univ Urbana Biological Computer Lab
Heinz Von Foerster. Mar 68, 28p Rept no. BCL-150
AFOSR-68-0774
Grant AF-AFOSR-7-67

Availability: Published in Electronic Handling of Information: Testing and Evaluation, p123-47 1967.

Descriptors: (*Information retrieval, Data processing systems), Humans, Reasoning, Memory, Perception (Psychology), Sensory perception, Nervous system, Bionics, Data storage systems, Language.
Identifiers: Information processing (Psychology).

A distinction is made between systems that provide for the storage and retrieval of documents, i.e., in which the data base as well as the data retrieved are documents, and those which compute from a set of relational structures--in this case only metaphorically to be called data base--the required information. In such systems 'storage' and 'retrieval' are replaced by 'abstraction' and 'specification.' Since these processes appear to be operative during a dialogue between an inquirer and an informant, some aspects of present day views and problems associated with physiological memory are discussed. Emphasis is given to the particular problem of representing questions and answers in natural language whose solution may ultimately lead to a mechanization of cognitive processes. (Author)
AD-668 284 Not available from CFSTI.

R AND D ABSTRACTS. VOLUME 21 NUMBER 1, 1-15 JANUARY 1968.
Ministry of Technology London (England) Technical Information and Library Services
1968, 80p

Descriptors: (*Reports, Abstracts), Information retrieval, Psychology, Biology, Aerodynamics, Plasma physics, Electric power production, Electronics, Spacecraft, Metallurgy, Aircraft, Meteorology, Chemistry, Rocket propulsion, Great Britain.
Identifiers: Announcement bulletins.

Contains abstracts of reports received by the Report Centre of the Ministry of Technology from various sources in the U.K. and from overseas (principally U.S.A.). A broad spectrum of scientific research is covered.
AD-668 315 HC$3.00 MF$0.65

THE SHOCK AND VIBRATION BULLETIN, PART VI.
Shock and Vibration Information Center (Defense) Washington D C
For primary bibliographic entry see Field 20K.
AD-668 328 HC$3.00 MF$0.65

DESCRIPTION OF A SET-THEORETIC DATA STRUCTURE.
Michigan Univ Ann Arbor
For primary bibliographic entry see Field 9B.
AD-668 404 HC$3.00 MF$0.65

PROBLEMS OF SCIENTIFIC-TECHNICAL TERMINOLOGY AND APPLIED LINGUISTICS,
Joint Publications Research Service, Washington, D. C.
For primary bibliographic entry see Field 5G.
JPRS-43994 HC$3.00 MF$0.65

AN ACCOUNT OF THE ACTIVITIES AND RESULTS OF THE FIRST YEAR OF OPERATION OF THE NEW ENGLAND RESEARCH APPLICATION CENTER FINAL REPORT, 1 APR. 1967 - 31 MAR. 1968.
Connecticut Univ., Storrs. New England Research Application Center.
31 Mar 68, 91p NASA-CR-93763
Contract NSR-07-002-029

Descriptors: *Communicating, *Documentation, *Information retrieval, Aerospace industry, Technologies, Utilization.
For abstract, see STAR 06 10.
N68-19896 HC$3.00 MF$0.65

PROCEEDINGS OF THE FORUM OF FEDERALLY SUPPORTED INFORMATION ANALYSIS CENTERS, 7-8 NOVEMBER 1967.
Federal Council for Science and Technology, Washington, D. C. Committee on Scientific and Technical Information.
1968, 72p
Sponsored by COSATI Panel no. 6, on Information Analysis and Data Centers.

Descriptors: (*Technical information centers, Symposia), Federal budgets, Documentation, Information retrieval, Scientific research, United States Government, Analysis, Law, Management planning, Effectiveness.
Identifiers: Information analysis centers, COSATI (Committee on Scientific and Technical Information), Freedom of Information Act, Copyright laws, Information systems.

Contents: Objectives of the forum and the activities of COSATI panel no. 6; Keynote address--The Congress, too, needs information analysis; Role and importance of information analysis centers; COSATI activities and the future of national information programs; The 'Freedom of Information' Act; Impact of the revised copyright law; Roundtable discussion--Freedom of Information Act, copyright law, and security requirements; Report of Working Group I--administrative problems; Report of Working Group II--data and information problems; Report of Working Group III--personnel problems; Report of Working Group IV--customer interactions; Report of Working Group V--information systems of the future; Report of Working Group VI--documentation systems of the future; Discussion following reports of group chairmen; Summary of problem areas and recommendations to COSATI; Attendance list of Forum of Federally Supported Information Analysis Centers.
PB-177 051 HC$3.00 MF$0.65

AN INFORMATION SYSTEM DEVELOPMENT PROGRAM.
CONSAD Research Corp., Pittsburgh, Pa.
15 Jan 68, 78p
Prepared in cooperation with Regional Planning Council, Baltimore, Md., and Department of Housing and Urban Development, Washington, D. C.

Descriptors: (*Documentation, Urban planning), (*Urban planning, *Data processing systems), Urban areas, Decision making, Libraries, Computers, Management planning.
Identifiers: *Information systems, Urban planning and development.

The report presents concepts and recommendations which will allow the Baltimore Regional Planning Council to move from a project oriented handling of data needs to a systems approach. This is necessary to better provide the decision-makers (government officials and the public they serve) with the precise organization of data needed in the decision making process. The report describes the components of the proposed system: library and related services; computerized information systems; electronic data processing (EDP) services; data collection and analyses, liaison, and support. Also recommended is a work program and the required staffing to implement such a system. (Author)
PB-177 809 HC$3.00 MF$0.65

ABSTRACTS FROM PAPERS PRESENTED AT THE JOINT ANNUAL MEETING OF THE ROCKY MOUNTAIN SECTION OF THE AMERICAN INDUSTRIAL HYGIENE ASSOCIATION AND THE RIO GRANDE CHAPTER OF THE HEALTH PHYSICS SOCIETY.
Sandia Corp., Albuquerque, N. Mex.
For primary bibliographic entry see Field 6R.
For abstract, see NSA 22 08.
SC-M-67-2959 HC$3.00 MF$0.65

5C. Economics

A NEW PETROLEUM AND NATURAL GAS SUBMODEL OF THE PARM PROTOTYPE MODEL.
National Resource Analysis Center Washington D C
For primary bibliographic entry see Field 21D.
AD-667 984 HC$3.00 MF$0.65

CONTINUITY PROPERTIES OF THE CORE OF A MARKET (REVISED VERSION).
Research memo.,
Hebrew Univ Jerusalem (Israel) Dept of Mathematics
Yakar Kannai, Jan 68, 54p Rept no. RM-34
Contract F61052-67-C-0094
See also Research Memorandum no. 33, AD-665 468. Research Program in Game Theory and Mathematical Economics.

Descriptors: (*Game theory, Economics), (*Economics, Mathematical models), Topology, Measure theory, Set theory, Distribution (Economics), Behavior, Problem solving, Theorems.
Identifiers: Limit theorems, Competition, Utility functions.

The behavior of the core of a market with a continuum of traders, when the initial bundles and the initial preferences of the traders are allowed to vary, is studied. A related problem which is also studied, is the relation between the limit theorems for n-trader markets as n goes to infinity, and the corresponding theorems for markets with a continuum of traders. Among the tools introduced are a topology on the space of possible preference relations of a trader, and notions of epsilon-core for markets. (Author)
AD-668 079 HC$3.00 MF$0.65

MATHEMATICAL PROGRAMMING AND ECONOMIC ANTHROPOLOGY.
Texas Univ Austin Dept of Anthropology
For primary bibliographic entry see Field 5K.
AD-668 259 HC$3.00 MF$0.65

CLASSIFICATION AND DISCRIMINATION IN THE ANALYSIS OF CREDIT RISKS: II.
Research rept.,
Carnegie-Mellon Univ Pittsburgh Pa Management Sciences Research Group
Giandomenico Majone, Mar 68, 34p Rept no. RR-128
Contract Nonr-760 (24)
See also Volume 1, AD-666 809.

Descriptors: (*Money, *Management planning), (*Decision theory, Economics), Probability, Optimization, Sampling, Performance (Human), Population (Mathematics), Correlation techniques, Mathematical models.
Identifiers: *Consumer credit management, Linear discriminant analysis, Sensitivity analysis, Bayes decision rules.

The report introduces a decision-theoretic approach to the problem of discriminating among several categories of credit risks. Bayesian decision rules are discussed and illustrated by a numerical example. Limitations of linear discriminant methods are pointed out. Practical problems concerning the unbiased testing of classification rules, the discriminations of rare patterns and the updating of the available statistical information are also discussed. The report concludes with a brief treatment of new approaches to sequential classification. (Author)
AD-668 322 HC$3.00 MF$0.65

SPECTRAL METHODS IN ECONOMETRICS,
Rand Corp Santa Monica Calif
G. S. Fishman. Apr 68, 292p Rept no. R-453-PR
Contract F44620-67-C-0045
Availability: Published in Copyrighted journal.

Descriptors: (*Economics, *Statistical analysis), Time series analysis, Stochastic processes, Statistical distributions, Sampling, Statistical functions, Simultaneous equations, Harmonic analysis, Correlation techniques, Integral transforms, Multivariate analysis, Adaptive systems, Mathematical models.
Identifiers: Econometrics, Spectrum analysis.

The report describes the spectral methods of time series analysis and its use in econometrics. The theory of covariance stochastic processes is introduced, with special emphasis on its application in econometrics. Univariate, bivariate, and multivariate spectral analysis are discussed, the latter two in terms of distributed lag models. Estimation procedures and approximating sampling distributions applicable to the spectrum, the cross spectrum, and the bivariate frequency response function are also described. The final chapter of the study illustrates the application of spectral techniques to an econometric problem: Income and consumption time series are examined using their sample spectra, cross spectrum, and an adaptive distributed lag model. (Author)
AD-668 364 Not available from CFSTI.

REVIEW OF 'PAKISTAN'S DEVELOPMENT: SOCIAL GOALS AND PRIVATE INCENTIVES,'
Rand Corp Santa Monica Calif
Wayne Wilcox. Apr 68, 5p Rept no. P-3823

Descriptors: (*Economics, Pakistan), Leadership, Population, Government (Foreign), Commerce, Industrial production, Reviews.
Identifiers: Book reviews.

Gustav Papanek, one of the early workers in Pakistan's reputedly hopeless vineyard, has watched and participated in the country's growth for more than a decade. As Director of Harvard's Development Advisory Service, he uses this book to simultaneously describe Pakistan's experience, to use the lessons of this experience to question many concepts in the development literature and to find in Pakistan's case ample evidence to destroy some of the shibboleths about traditional societies and traditional man. As Edward Mason cautions in the foreword, the arguments are made with considerable vigor as is appropriate to an author who has had something to do with the successes he describes. (Author)
AD-668 418 HC$3.00 MF$0.65

A NOTE ON A SIMULATED STOCK MARKET,
Yale Univ New Haven Conn Cowles Foundation for Research in Economics
Martin Shubik. 10 Apr 68, 21p Rept no. Discussion Paper-249
Contract Nonr-3055 (01)

Descriptors: (*Game theory, *Economics), Bargaining, Simulation, Money, Motivation, Group dynamics, Behavior, Distribution (Economics), Mathematical models.
Identifiers: *Stock market.

The note describes a stock market game played in a simulated stock market associated with the playing of a business game. The possibility of using a stock market game as an experimental device to study expectations and market behavior is discussed and the data from a run of this game together with some analysis are presented. (Author)
AD-668 489 HC$3.00 MF$0.65

NORMATIVE ACCOUNTING THEORY AND THE THEORY OF DECISION,
California Univ Los Angeles Western Management Science Inst
For primary bibliographic entry see Field 5A.
AD-668 495 HC$3.00 MF$0.65

ECONOMICS OF INQUIRING, COMMUNICATIONS, DECIDING,
California Univ Los Angeles Western Management Science Inst
For primary bibliographic entry see Field 5A.
AD-668 496 HC$3.00 MF$0.65

METHODOLOGY FOR PROJECTION OF OCCUPATIONAL TRENDS IN THE DENVER STANDARD METROPOLITAN STATISTICAL AREA,
Colorado Univ., Boulder. Bureau of Economic Research.
For primary bibliographic entry see Field 5I.
PB-177 325 HC$3.00 MF$0.65

ANNUAL REPORT, JULY 1, 1966-JUNE 30, 1967.
Northern Wisconsin Development Center, Wausau.
1968, 63p
Contract C316-66
See also PB-170 320.

Descriptors: (*Economics, *Management control systems), (*Industries, Efficiency), Management planning, Management engineering, Reliability, Commerce, Production control, Quality control, Manufacturing methods, Manpower studies, Cost effectiveness, Industrial research, Industrial production, Industrial plants, Reports.

The bulk of this report deals with 1966-67 NWDC work with 75 firms and projects (Section II). The section is divided into two parts. The first part reports work with 15 firms in which NWDC maintained frequent, in-depth contact with management. These 15 are referred to as 'intensive' firms. The second part contains brief descriptions of work with 60 other firms, proposed developments, community groups, and recreation projects. Work with these 60 involved either initial contact or discussion of a specific problem, and is therefore referred to as 'non-intensive'. Section I contains a summary of NWDC 1966-67 activity. Tables define assisted firms by type of industry and size of employment force, and report NWDC work by kinds of recommendations. Employment, payroll, and gross sales data for the 15 'intensive' firms are also included. Section III is devoted to an evaluation of NWDC activity through an inventory of the goals which had been defined for the past fiscal year. In effect, this review is intended to answer the question: 'How well did we accomplish what we set out to do'.
PB-177 404 HC$3.00 MF$0.65

RETRAINING AND MIGRATION AS FACTORS IN REGIONAL ECONOMIC DEVELOPMENT,
Wisconsin Univ., Madison. Industrial Relations Research Inst.
Gerald G. Somers. 15 Sep 66, 99p
Prepared in cooperation with Office of Regional Economic Development, Washington, D. C.

Descriptors: (*Economics, *Retraining), Labor, Manpower studies, Cost effectiveness, Law, Education, Employment, Mobility, United States, Western Europe, Management planning, Training.
Identifiers: Investments.

Contents: Human resources and economic development; Investment in physical capital and human capital; Federal legislation and regional development; Retraining, human capital and growth; U. S. experience with retraining; Western European experience; The role of vocational education; Extent and patterns of migration; The mobile and immobile worker; The reasons for mobility; Retraining and mobility; Relocation policies at home and abroad.
PB-177 499 HC$3.00 MF$0.65

SURVEY ON TELEMETRIC EQUIPMENT AND SYSTEMS IN GERMANY.
Soskuty (O. V.), Frankfurt am Main (West Germany).
For primary bibliographic entry see Field 9F.
PB-177 884 HC$3.00 MF$0.65

MID-AMERICA INDUSTRIAL DISTRICT PRYOR, OKLAHOMA. VOLUME I. GENERAL DEVELOPMENT PLAN.
Hudgins, Thompson, Ball and Associates, Inc., Oklahoma City, Okla.
Jun 64, 101p
Contract CC-6029
See also Volume 2, PB-177 886. Prepared in cooperation with Development Planning Associates, Inc., Los Angeles and San Francisco, Calif., and The Pace Co., Houston, Tex.

Descriptors: (*Management planning, Urban areas), Research program administration, Population, Growth, Employment, Industries, Climatology, Sociometrics, Labor, Predictions, Public relations, Periodicals, Hydrology, Transportation, Costs, Money, Budgets, Civil engineering, Commerce, Value engineering, Terrain, Police, Arkansas, Kansas, Missouri, Oklahoma, Texas.
Identifiers: MAID (Mid-America Industrial District), Area planning and development.

The Mid-America Industrial District encompasses an area of 8,320 acres on a main highway connecting Kansas City and St. Louis with Dallas and Houston, 40 miles east of Tulsa, Oklahoma. In order to create a general development plan in accordance with stated objectives, a study was based on market considerations and other location factors, topography and other physical considerations, and improved utilization of existing facilities development. (Author)
PB-177 885 HC$3.00 MF$0.65

GENERAL DEVELOPMENT PLAN MID-AMERICA INDUSTRIAL DISTRICT PRYOR, OKLAHOMA. VOLUME 2. APPENDIX.
Hudgins, Thompson, Ball and Associates, Inc., Oklahoma City, Okla.
For primary bibliographic entry see Field 5I.
PB-177 886 HC$3.00 MF$0.65

A COMPARISON OF SHOPPING TIMES IN 'HIGH-STREET' AND 'PRECINCT' TYPES OF SHOPPING AREA,
Road Research Lab., Crowthorne (England).
For primary bibliographic entry see Field 13B.
PB-177 904 HC$3.00 MF$0.65

PAPERMAKING AND MANUFACTURE OF PAPER PRODUCTS AS A SMALL-SCALE, SEMI-MECHANIZED AND COTTAGE INDUSTRY. MATERIALS--PROCESSES--EQUIPMENT ORGANIZATION--ECONOMICS--MARKETING,
International Cooperation Administration, Washington, D. C.
For primary bibliographic entry see Field 11L.
PB-177 916 HC$3.00 MF$0.65

MACHINERY MANUFACTURING COST ACCOUNTING.
International Cooperation Administration, Washington, D. C. Office of Industrial Resources.
For primary bibliographic entry see Field 5A.
PB-177 950 HC$3.00 MF$0.65

QUALITY CONTROL.
Agency for International Development, Washington, D. C. Communications Resources Div.
1962, 73p Technical Bull-66
Prepared in cooperation with Andrews (George H.) Engineering Associates, Inc., Washington, D. C.

Descriptors: (*Industrial production, *Quality control), Design, Production, Specifications, Materials, Personnel, Quality control, Industrial equipment, Employment, Commerce, Management control systems.

Contents: Controls and methods; Designing products; Specifications; Materials; Equipment and quality control; Tools control quality; Personnel responsibility; Effect of working conditions; Marketing and research; and Course summary.
PB-177 957 HC$3.00 MF$0.65

SALES PROMOTION METHODS,
International Cooperation Administration, Washington, D. C. Technical Aids Branch.
For primary bibliographic entry see Field 5A.
PB-177 967 HC$3.00 MF$0.65

ECONOMICS OF INDUSTRIAL DEVELOPMENT,
Agency for International Development, Washington, D. C. Communications Resources Div.
Allen B. Dickerman. 1962, 75p Training Manual-143
Prepared in cooperation with Syracuse Univ., N. Y. Dept. of International Management Development.

Descriptors: (*Management engineering, Instruction manuals), (*Economics, Government (Foreign)), (*Industrial production, Economics), Theory, Money, Sociology, Personality, Industrial training, Manpower, Political science, Commerce, Patents, Labor, Manpower studies, Government (Foreign), Scientific research, Management engineering.
Identifiers: Taxes, Industrial development.

Contents: Theories of economic development; Capital requirements--the key to development; The entrepreneural function; The labor force; Taxation; Foreign investment and trade; Science and technology.
PB-177 983 HC$3.00 MF$0.65

IVORY COAST: INTERNATIONAL CUSTOMS TARIFFS.
1st ed., Year 1967-1968.
International Customs Tariffs Bureau, Brussels (Belgium).
Dec 67, 178p
Pub. as International Customs Journal Bull-172.

Descriptors: (*Commerce, *Ivory Coast), (*Costs, Commerce), Industrial production, Statistical data, Law, Belgium.
Identifiers: *Tariffs, Customs laws.

The journal gives, in respect of each article listed in the nomenclature, the duties and taxes to be levied by the customs on imports and exports, and the restrictions and prohibitions applicable.
PB-177 989 HC$3.00 MF$0.65

ISRAEL: INTERNATIONAL CUSTOMS TARIFFS.
6th ed., Year 1967-1968.
International Customs Tariffs Bureau, Brussels (Belgium).

Nov 67, 245p
Pub. as International Customs Journal Bull-41.

Descriptors: (*Commerce, *Israel), (*Costs, Commerce), Industrial production, Statistical data, Law, Belgium.
Identifiers: *Tariffs, Customs laws.

The journal gives, in respect of each article listed in the nomenclature, the duties and taxes to be levied by the customs on imports and exports, and the restrictions and prohibitions applicable.
PB-177 990 HC$3.00 MF$0.65

A STUDY OF METHODS FOR FORECASTING EMPLOYMENT,
Illinois Univ., Urbana. Inst. of Labor and Industrial Relations.
Adolf Sturmthal. Dec 67, 58p
Grant DL-91-15-66-29

Descriptors: (*Employment, Mathematical prediction), (*Railroads, Employment), Industrial research, Test methods, Correlation techniques, Equations, Economics, Research program administration, Manpower studies, Statistical analysis, Money, Employee relations, Collecting methods, Regression analysis, Linear systems, Mathematical models, Transportation, Volume, Production.

The forecasts presented in this study of employment for the United States railroad industry for 1961-64 (or in some cases for 1965) are in the nature of conditional forecasts. Insofar as a single figure is presented, they are also point estimates. The broad method of forecasting adopted here is in the nature of linear extrapolations, the particular technique of estimation adopted being linear regression prediction. In estimating employment for the railroad industry, two types of interdependencies between the relevant variables have been specified. The first kind of model assumes a linear relation between employment, output of the industry, output of competing industries whose outputs are close substitutes to that of railroads, and capital equipment of the railroad industry. (Author)
PB-178 008 HC$3.00 MF$0.65

TIMBER MANAGEMENT GUIDE FOR SHORTLEAF PINE AND OAK-PINE TYPES IN MISSOURI.
North Central Forest Experiment Station, St. Paul, Minn.
For primary bibliographic entry see Field 2F.
PB-178 014 HC$3.00 MF$0.65

FEASIBILITY STUDY: INTERNATIONAL TRADE TOURIST - CONVENTION AND CULTURAL FACILITIES, LAREDO, TEXAS.
Caudill, Rowlett and Scott, Houston, Tex.
Apr 63, 62p

Descriptors: (*Economics, Recreation), (*Recreation, Texas), Symposia, Feasibility studies, Design, Site selection, Impact, Commerce, Roads, Population, Urban areas, Culture, Buildings, Urban planning, History, Costs, Music, Analysis.
Identifiers: Area planning and development.

The feasibility study contains planning for international trade, Tourist convention and cultural facilities in Laredo, Texas. (Author)
PB-178 019 HC$3.00 MF$0.65

TECHNIQUE FOR AREA PLANNING: THE DEVELOPMENT OF A MANUAL FOR ECONOMIC IMPACT ANALYSIS IN URBAN AREAS.
Final rept.
Regional Economic Development Inst., Inc., Pittsburgh, Pa.
Dec 67, 83p
Contract C-306-66

Descriptors: (*Economics, *Urban areas), Feasibility studies, Impact, Analysis, Industries, Mobilization, Design, Urban planning, Sensitivity, Correlation techniques, Mathematical analysis, Instruction manuals, Costs, Industrial production, Theory, Predictions, Tables.
Identifiers: Area planning and development.

The study develops and evaluates a proposed interindustry impact analysis technique for use in urban areas. (Author)
PB-178 057 HC$3.00 MF$0.65

TECHNIQUE FOR AREA PLANNING: A MANUAL FOR THE CONSTRUCTION AND APPLICATION OF A SIMPLIFIED INPUT-OUTPUT TABLE.
Regional Economic Development Inst., Inc., Pittsburgh, Pa.
Dec 67, 212p
Contract C-306-66

Descriptors: (*Urban planning, Data processing systems), (*Data processing systems, *Instruction manuals), Industries, Sociology, Motivation, Economics, Distribution (Economics), Manpower studies, Operations research, Industrial research, Feasibility studies, Employment, Production, Inventory analysis, Commerce, Programming (Computers), Programming languages, Input-out devices, Matrix algebra, Questionnaires.
Identifiers: IBM 7090, FORTRAN, Accounting.

The objective in writing the manual was one of providing planners and community leaders with a document which would enable them to perform an inexpensive but useful economic study. It was assumed that the typical reader will have only a limited acquaintance with economics, and avoided the use of jargon as much as possible. The authors tried to make the manual complete with respect to the development of the analytical tool. No attempt was made to suggest how to formulate or implement a regional plan. The technique presented is essentially a system for organizing and analyzing information about the regional economy so that it can be used more effectively by the planner. (Author)
PB-178 058 HC$3.00 MF$0.65

5D. History, Law, and Political Science

JAPAN-U.S. RELATIONS AND ASIAN DEVELOPMENT PROBLEMS
Rand Corp Santa Monica Calif
Charles Wolf, Jr. Apr 68, 9p Rept no. P-3825
Prepared for presentation at a conference on Japan-U. S. Relations and Asian Security Problems held at Lake Yamanaka (Japan), 1-4 Apr 1968.

Descriptors: (*Foreign policy, Asia), Economics, Commerce, Political science, Foreign aid, Labor, Effectiveness.

Various aspects of modernization in Asia, likely to be of continuing concern to Japan and the U. S. in the future are discussed. Both Japan and the U. S. confront many of the same basic problems in understanding and influencing development in the less developed countries (LDCs) of the Asian area. Three such problems are: (1) Investment in people vs. investment in things; (2) Policies vs. investment; (3) Economic development and political development.
AD-668 071 HC$3.00 MF$0.65

AFTER TURMOIL, THE UPWARD CLIMB,
Rand Corp Santa Monica Calif
Guy J. Pauker. Apr 68, 11p Rept no. P-3821
Prepared for publication in Los Angeles Times, Mar 31, 1968.

Descriptors: (*Political science, Indonesia), Economics, Leadership, Communism, History, Insurgency, Foreign aid, Commerce, Government (Foreign).

The United States, Japan, and the major Western European countries are spending $325 million, or about one percent of the cost of our effort in Vietnam, to help the consolidation of the Indonesian government. In its foreign policy Indonesia is anxious to regain the confidence of the international community, after several years of trouble-making by former President Sukarno. Indonesia is attempting to reestablish cordial, rather than just correct, relations with the United States.
AD-668 104 HC$3.00 MF$0.65

DEMOCRATIC REVOLUTIONARY INSURGENCY AS AN ALTERNATIVE STRATEGY,
Rand Corp Santa Monica Calif
Constantine Menges. Mar 68. 12p Rept no. P-3817

Descriptors: (*Insurgency, *Foreign policy), Political science, Government (Foreign), Guerrilla warfare, Communism, Attitudes, Military strategy, Threat evaluation.
AD-668 105 HC$3.00 MF$0.65

MANUAL OF INTERNATIONAL MARITIME LAW. PART II. INTERNATIONAL LEGAL REGIME OF INDIVIDUAL OCEAN THEATERS,
Department of the Navy Washington D C
P. D. Barabolya, A. S. Bakhov, L. A. Ivanashchenko, D. N. Kolesnik, and V. D. Logunov.
21 Feb 68. 214p Rept no. Trans-2500 (b)
Trans. of mono. Voenno-Morskoi Mezhdunarodno-Pravovoi Spravochnik, Moscow, 1966 pi-v, 267-475.

Descriptors: (*International law, Shipping (Marine)), Naval operations, Baltic sea, Black sea, Mediterranean sea, Pacific ocean, Naval mine warfare, Foreign policy, USSR.
Identifiers: Translations, Maritime law, Caspian sea, Naval blockades, Neutrality.

Contents: Northern maritime theater; Baltic Sea theater; Black Sea theater; Mediterranean theater; Caspian Sea theater; Pacific Ocean theater; The prohibition of wars of aggression; International legal statutes applicable to war at sea; Neutrality, rights and obligations of neutral states; and Cessation of war.
AD-668 381 HC$3.00 MF$0.65

EMERGENT LEADERS IN DEVELOPING NATIONS.
Final rept.,
Harvard Univ Cambridge Mass Center for International Affairs
Seymour M. Lipset. 8 Apr 68. 6p
AFOSR-68-0752
Grant AF-AFOSR-1205-67

Descriptors: (*Political science, Government (Foreign)), Leadership, Students, Attitudes, Questionnaires, Behavior, Public opinion.
Identifiers: *Developing nations.

The report indicates research analyses made and lists reports produced on problems of comparative national development, with particular reference to the role and attitudes of university students as a source of political pressure and as the future elite of various countries. The research covered three areas: (1) General problems of political development in emergent nations; (2) efforts to test propositions concerning the role and influence of young (student) elites; and (3) methodological studies relating to the conduct of comparative research. The analyses were made on the basis of survey and other data collected under private foundation and university support funds in a number of countries in Latin America, North Africa, Eastern Europe, and India. Data on students in the U.S. was used for comparative purposes. (Author)
AD-668 467 HC$3.00 MF$0.65

THE POLITICAL ORGANIZATION OF SOVIET SOCIETY,
Joint Publications Research Service, Washington, D. C.
I. A. Azovkin, and P. I. Romanov. 10 Jan 68. 37p

Trans. of mono. Politicheskaya Organizatsiya Sovetskogo Obshchestva, Moscow, 1967, p5-8, 163-87, 417-9.

Descriptors: (*Political science, USSR), Communism, Government (Foreign), Leadership, Population, Economics.

Contents: Improvement of the forms and methods of state administration; Further expansion of participation of the masses in the work of the apparatus of state administration; Strengthening popular control over the activity of the apparatus of state administration.
JPRS-43955 HC$3.00 MF$0.65

5E. Human Factors Engineering

TINTED WINDSCREENS IN U. S. ARMY AIRCRAFT,
Army Aeromedical Research Unit Fort Rucker Ala
For primary bibliographic entry see Field 1C.
AD-667 960 HC$3.00 MF$0.65

THE INFLUENCE OF BREECH ORIENTATION OF THE XM150E4 GUN ON THE LOADER'S TASK AS RELATED TO THE M60A1E1 TANK.
Human Engineering Labs Aberdeen Proving Ground Md
For primary bibliographic entry see Field 19F.
AD-668 229 HC$3.00 MF$0.65

THE PROBLEM OF OFF DUTY TIME IN LONG DURATION SPACE MISSIONS. VOLUME 1 - SUMMARY AND RESEARCH RECOMMENDATIONS.
Serendipity Associates, Mclean, Va.
J. W. Eberhard. Oct 67. 33p NASA-CR-93834, TR-55-67-13/U/. V. 1
Contract NASW-1615

Descriptors: *Manned space flight, *Psychological factors, *Social factors, Astronaut performance, Confining, Human factors engineering, Relaxation (physiology), Work-rest cycle.

For abstract, see STAR 06 10.
N68-20265 HC$3.00 MF$0.65

A STUDY OF THE PERFORMANCE OF AN ASTRONAUT DURING INGRESS AND EGRESS MANEUVERS THROUGH AIRLOCKS AND PASSAGEWAYS.
Environmental Research Associates, Randallstown, Md.
W. J. Bruchey, Jr., and H. L. Loats, Jr.. Apr 68. 163p NASA-CR-971
Contract NAS1-4059
Coll- 163 P Refs

Descriptors: *Astronauts, *Human performance, *Spacecraft cabin simulators, *Submerged bodies, *Weightlessness simulation, Doors, Entrances, Human factors engineering, Reduced gravity, Space environment simulation, Water.

For abstract, see STAR 06 10.
N68-20339 HC$3.00 MF$0.65

EFFECTS OF PRESSURE SUITS AND BACKPACK LOADS ON MAN'S SELF-LOCOMOTION IN EARTH AND SIMULATED LUNAR GRAVITY.
National Aeronautics and Space Administration. Langley Research Center, Langley Station, Va.
R. L. Harris, and A. A. Spady, Jr.. Apr 68. 46p NASA-TN-D-4464
Contract 127-51-03-02-23

Descriptors: *Astronaut locomotion, *Life support systems, *Lunar gravitational effects, *Pressure suits, *Weightlessness simulation, Astronaut performance, Graphs (charts), Human factors engineering.

For abstract, see STAR 06 10.
N68-20354 HC$3.00 MF$0.65

AN INTRODUCTION TO THE ASSURANCE OF HUMAN PERFORMANCE IN SPACE SYSTEMS.
National Aeronautics and Space Administration, Washington, D. C.
1968. 42p NASA-SP-6506
Prep- Prepared By Martin Co.

Descriptors: *Aerospace systems, *Errors, *Human factors engineering, *Human performance, Man machine systems, Reliability, Space missions, Systems engineering.

For abstract, see STAR 06 10.
N68-20357 HC$3.00 MF$0.65

PERFORMANCE DISCUSSIONS.
Agency for International Development, Washington, D. C. Communications Resources Div.
For primary bibliographic entry see Field 5A.
PB-177 979 HC$3.00 MF$0.65

5F. Humanities

THE JEW AND THE BARBER: ABOUT THE PARTICULAR AND THE GENERAL,
Rand Corp Santa Monica Calif
Heddy Jason. Apr 68. 24p Rept no. P-3819
Prepared for presentation at the Annual California Folklore Society Meeting, Berkeley, 12-13 Apr 1968.

Descriptors: (*Culture, Analysis), Language, Linguistics, Verbal behavior, Reviews.
Identifiers: Folktales, Ethnic groups.

A review of the Jewish literature shows a rather great concern with the problem of inter-ethnic tensions. If the situation of the Jew in the Middle Ages was in some respects a unique one, the question may be raised whether the respective folk tales are not unique also, at least in some respects. The author discusses the issue and deals with a product of the medieval traditional culture, the sacred tale.
AD-668 106 HC$3.00 MF$0.65

MOLECULAR BIOLOGY AND THE PROBLEM OF DEVELOPMENT,
Joint Publications Research Service, Washington, D. C.
For primary bibliographic entry see Field 6C.
JPRS-44595 HC$3.00 MF$0.65

GREEN SPRING PLANTATION: ARCHEOLOGICAL REPORT,
Colonial National Historical Park, Yorktown, Va.
Louis R. Gaywood. 25 May 55. 62p
Prepared for Virginia 350th Anniversary Commission and Jamestown-Williamsburg-Yorktown-Celebration Commission.

Descriptors: (*Archaeology, Virginia), Buildings, Foundations (Structures), Culture, History.
Identifiers: Green Spring Plantation Site.

Green Spring Plantation was the Seventeenth Century home of Sir William Berkely, Governor of Virginia. This was the first large country house in America and the excavation uncovered many artifacts of the period which give an indication of life among the well-to-do at that time as well as recording architectural details of the plantation. (Author)
PB-177 646 HC$3.00 MF$0.65

5G. Linguistics

ALGORITHM OF THE SELECTION OF CONCEPTS WITH THE HELP OF A SYNTACTIC TABLE,
Foreign Technology Div Wright-Patterson AFB Ohio
E. A. Zhogolev. 9 Jun 67. 22p Rept no. FTD-MT-67-76
Edited machine trans. of Zhurnal Vychislitelnoi Matematiki i Matematicheskoi Fiziki (USSR), v5 n4 p689-98 1965.

Descriptors: (*Machine translation, Algorithms), USSR, Syntax, Symbols, Semantics, Coding, Computer programs, Subroutines, Data storage systems.
Identifiers: Translations, Algol.

The method of machine translation described in this article concerns the principles of organization in algorithmic language (in this case in the (ALGOL-60)) and are calculated basically for small machines. However, they can be used in multipass translators. It is natural in the structure of the translator to separate the part realizing the syntax of the language and the part realizing its sematics. In connection with this there was selected the following structure of the translator: (a) the syntax of the language is assigned a special syntactic table; (b) the semantics of the language is assigned a library of subprograms such as each syntactic unit of the language (metavariable) corresponds to its 'semantic' subprogram; (c) the operation of the translator is ensured by a certain control program, which consecutively (one by one) selects the basic symbols of the language from the recording of the algorithm, turns their sequences, according to the syntactic table into increasingly enveloping syntactic units and with the selection of each unit turns to the corresponding semantic subprogram; in other words, in a given control program the algorithm of the selection of concepts is realized. (Author)
AD-668 030 HC$3.00 MF$0.65

LANGUAGES, AUTOMATA AND CLASSES OF CHAIN-ENCODED PATTERNS.
Technical rept.,
New York Univ N Y Lab for Electroscience Research
Jerome Feder. Aug 67, 60p Rept no. TR-400-165
AFOSR-68-0794
Grant AF-AFOSR-24-66

Descriptors: (*Pattern recognition, *Linguistics), (*Artificial intelligence, Automata), (*Learning machines, Automata), Language, Cybernetics, Coding, Grammars, Classification, Statistical functions, Programming (Computers), Special functions (Mathematical), Algorithms, Theorems.
Identifiers: Turing machines, Automata theory, Chain codes, String languages.

By treating patterns as statements in a two-dimensional language, it is possible to apply linguistic theory to pattern analysis and recognition. This report presents an approach to a classification scheme for pattern languages that could provide information about types of programs and computation facilities capable of meeting particular pattern analysis and recognition requirements. Consideration is restricted to line patterns encoded in the chain code developed by Freeman. This encoding method represents a line pattern by a sequence of octal digits called a chain. Results can be extended to other forms of encoding when translators between codes can be built. The report compares languages formed by Boolean functions of languages and by the concatenation of strings of a number of languages with pattern languages. Pattern languages based on families of equations in two variables and formed from chains of straight lines, circles, and circular arcs are related to string language classes. Pattern properties, including closure, self-intersection, convexity, and periodicity, are examined. Pattern languages are also considered that are similar in various ways to an arbitrary given chain. Although the patterns considered in this report are relatively simple ones, it appears possible by means of language rules of a table-driven pattern analyzer to extend the approach to pattern classes containing more complex patterns. (Author)
AD-668 081 HC$3.00 MF$0.65

DERIVATION-BOUNDED LANGUAGES,
System Development Corp Santa Monica Calif
Seymour Ginsburg, and Edwin H. Spanier. 8 Jan 68, 42p Rept nos. Scientific-14, TM-738/041/00
AFCRL-68-0080
Contract F19628-67-C-0008, Grant AF-AFOSR-1203-67
See also Scientific rept. no. 16, AD-668 089.

Descriptors: (*Phrase structure grammars, Analysis), Language, Context free grammars, Theorems.

A derivation is a phrase-structure grammar is said to be k-bounded if each word in the derivation contains at most k occurrences of nonterminals. A set L is said to be derivation bounded if there exists a phrase-structure grammar G and a positive inter k such that L is the set of words in the language generated by G which have some k-bounded derivation. The main result is that every derivation-bounded set is a context-free language. Various characterizations of the derivation-bounded languages are then given. For example, the derivation-bounded languages coincide with the standard matching-choice sets discussed by Yntema. They also coincide with the smallest family of sets containing the linear context free languages and closed under arbitrary substitution. (Author)
AD-668 087 HC$3.00 MF$0.65

TWO-WAY BALLOON AUTOMATA AND AFL,
System Development Corp Santa Monica Calif
Seymour Ginsburg, and John Hopcroft. 25 Jan 68, 32p Rept nos. Scientific-15, TM-738/042/00
AFCRL-68-0081
Contract F19628-67-C-0008, Grant AF-AFOSR-1203-67
Prepared in cooperation with University of Southern California, Los Angeles, and Cornell Univ., Ithaca, N. Y.

Descriptors: (*Language, Set theory), Automation, Mathematical models, Context free grammars, Symbols, Acceptability, Mathematical analysis, Statistical functions, Mapping, Scanning, Simulation, Data storage systems, Information retrieval.
Identifiers: Homomorphism (Language), *Abstract family language, Stacks (Symbols), Balloon automata.

It is shown that if the family of languages accepted by a closed class of two-way balloon automata is closed under length-preserving homomorphism, then this family is an AFL closed under intersection and e-free substitution. It is then proved that the family of languages accepted by the closed class of two-way balloon automata of (nonerasing) (deterministic) stack acceptors is such a family. (Author)
AD-668 088 HC$3.00 MF$0.65

SCATTERED CONTEXT GRAMMARS,
System Development Corp Santa Monica Calif
Sheila Greibach, and John Hopcroft. 1 Feb 68, 30p Rept nos. Scientific-16, TM-738/043/00
AFCRL-68-0159
Contract F19628-67-C-0008, Grant AF-AFOSR-1203-67
See also Scientific rept. no. 14, AD-668 087.

Descriptors: (*Context sensitive grammars, Analysis), Language, Automata, Syntax, Symbols, Theorems, Programming languages.
Identifiers: *Turing machines.

Scattered context grammars are defined and the closure properties of the family of languages generated are considered. This family of languages is contained in the family of context-sensitive languages and contains all languages accepted by linear time nondeterministic Turing machines. (Author)
AD-668 089 HC$3.00 MF$0.65

THE JEW AND THE BARBER: ABOUT THE PARTICULAR AND THE GENERAL,
Rand Corp Santa Monica Calif
For primary bibliographic entry see Field 5F.
AD-668 106 HC$3.00 MF$0.65

PREDICATION-TYPING: A PILOT STUDY IN SEMANTIC ANALYSIS,
Bunker-Ramo Corp Canoga Park Calif
Paul L. Garvin, Jocelyn Brewer, and Madeleine Mathiot. Jun 67, 125p Rept no. Language mono-27
AFOSR-68-0765
Contract AF 49 (638)-1516
Availability: Published in Language - Journal of the Linguistic Society of America, Suppl. v43 n2 pt-2 Jun 1967.

Descriptors: (*Semantics, Analysis), Language, Linguistics, Behavior, Classification, Speech, Vocabulary.

The monograph reports on an effort to develop an inductive approach to the identification and description of semantic relations. It is proposed that such a description will result in the formulation of a semantic classification of pertinent linguistic units. The fundamental assumption underlying the present approach is that the meanings of the elements of a language are related to each other in a nonhaphazard way, and thus may be described in terms of a semantic structure. This is based on the broader assumption that all human behavior is patterned, and is supported by the informal observation that the meanings of the elements of language exhibit distinct similarities and dissimilarities which are suggestive of systematic patterning. In the present approach, whenever a structure is assumed, it is viewed as describable in terms of units and their relations. The relations between units are basically of two kinds: relations of class inclusion and relations of patterns of co-occurrence, which are called paradigmatic and syntagmatic, respectively. A further basic assumption is that the structure of a language can be studied by observing its manifestations in speech behavior or recorded text. There is no one-to-one correspondence between the aims of the description and the techniques. The same techniques may be used to deal with either units or classes, the determining factors for the choice of a technique being relevance to the given aim and operational feasibility. (Author)
AD-668 307 Not available from CFSTI.

INTERCONSONANTAL DIFFERENCES.
Technical rept.,
Ohio State Univ Research Foundation Columbus
John W. Black. 4 Apr 68, 31p Rept no. 115
Contract Nonr-495 (18)
Parts I-II presented to Psycholinguistic Seminars in Rome, May 19 and Milan, May 26, 1967. Part III presented to International Congress of Linguistics (10th) Bucharest Aug 28-Sep 2 1967.

Descriptors: (*Linguistics, Factor analysis), Speech recognition, Phonetics, Psychoacoustics, Correlation techniques.
Identifiers: *Psycholinguistics, *Consonants.

Twenty-four consonants that occur initially in English syllables spoken in pairs of contrasting syllables, as /pi-bi/, /pi-mi/.../pi-ji/, /be-pe/, /be-me/.../be-je/, /ja-pa/, /ja-ma/.../ja-wa/.... Each row contained 24 pairs of syllables including a pair in which the syllable was repeated; a row contained one of five vowels, /i, e, a, o, u/, and there were 24 rows, one for each initial consonant. A different speaker read and recorded each row of syllables. Twenty-four listeners heard the recorded syllables and assigned to each pair a numerical evaluation of 'sameness in sound.' This was in keeping with the psychophysical method of magnitude estimation. The pooled judgments of the listeners were subjected to a factor analysis. They were also scaled in terms of 'sameness disparity' in sound. The twelve factors that were isolated tended to accord prominence to place of articulation, to glide-like characteristics, and to the intensity-duration of friction in categorizing consonanats in terms of 'sameness in sound.' (Author)
AD-668 497 HC$3.00 MF$0.65

PROBLEMS OF SCIENTIFIC-TECHNICAL TERMINOLOGY AND APPLIED LINGUISTICS,
Joint Publications Research Service, Washington, D. C.
P. V. Veselov, V. I. Sirota, E. P. Stenkovskaya, and O. I. Strizhevskaya. 12 Jan 68, 15p
Trans. of Filologicheskie Nauki (sic) n5 p58-67 1967.

Descriptors: (*Linguistics, Vocabulary), Standardization, Symbols, Classification, Information retrieval, Indexes, USSR.

Contents: Standardization of technical terminology in the USSR; Some trends in the development of applied linguistics.
JPRS-43994 HC$3.00 MF$0.65

5H. Man-Machine Relations

VISIBILITY ON RADAR SCOPES,
Johns Hopkins Univ., Baltimore, Md. Psychological Lab.
Stanley B. Williams. Feb 49, 55p
SPECDEVCEN-166-1-82
Contract N5ori-166 (01)

Descriptors: (*Cathode ray tube screens, *Visibility), (*Radar equipment, *Display systems), Man-machine systems, Military personnel, Radar images, Visual perception, Radar operators, Optics, Psychophysiology.

Contents: Cathode-ray tubes used as radar scopes; Methods of research on visibility; Factors influencing visibility; Research on visibility; Deflection modulated scopes; Research on visibility; Intensity modulated scopes; Pipology.
AD-493 403 HC$3.00

EVALUATION OF POINTING TO A SHARP EDGE.
Washington Univ Seattle Dept of Civil Engineering
For primary bibliographic entry see Field 15D.
AD-668 260 HC$3.00 MF$0.65

DEVELOPMENT OF HIERARCHICAL GRAPHICAL LOGICAL ENTITY CAPABILITIES: DISPLAY SYSTEM OPERATOR'S MANUAL.
Adams Associates Inc Bedford Mass
For primary bibliographic entry see Field 9B.
AD-668 425 HC$3.00 MF$0.65

DEVELOPMENT OF HIERARCHICAL GRAPHICAL LOGICAL ENTITY CAPABILITIES: ENTITY TABLE DESIGN.
Adams Associates Inc Bedford Mass
For primary bibliographic entry see Field 9B.
AD-668 426 HC$3.00 MF$0.65

DEVELOPMENT OF HIERARCHICAL GRAPHICAL LOGICAL ENTITY CAPABILITIES: TIME-SHARING INPUT-OUTPUT EXECUTIVE (10X) PROGRAMMER'S MANUAL.
Adams (Charles W) Associates Inc Bedford Mass
For primary bibliographic entry see Field 9B.
AD-668 427 HC$3.00 MF$0.65

DEVELOPMENT OF HIERARCHICAL GRAPHICAL LOGICAL ENTITY CAPABILITIES: DISPLAY SYSTEM PROGRAM MANUAL.
Adams Associates Inc Bedford Mass
For primary bibliographic entry see Field 9B.
AD-668 428 HC$3.00 MF$0.65

DISPLAYS FOR STUDYING SIGNAL DETECTION AND PATTERN RECOGNITION,
General Dynamics Corp., Groton, Conn. Electric Boat Div.
Taylor L. Booth, Robert M. Glorioso, Herbert M. Kaufman, Robert M. Levy, and James R. Walter. 1 Jul 67, 15p U417-67-029
Contract Nonr-2512 (00)
Prepared in cooperation with Connecticut Univ., Storrs. Dept. of Electrical Engineering and Dept. of Psychology.

Descriptors: (*Display systems, *Pattern recognition), (*Operators (Personnel), *Performance (Human)), Detection, Cathode ray tubes, Computers, Moving target indicators, Simulation, Tachistoscopes, Computer programs, Data processing systems.
Identifiers: PDP-5 data processing systems.

The use of a unique computer-controlled (PDP-5) CRT display system with light pen facility in the study of a wide range of signal detection and pattern recognition problems is described. The displays used to study the capabilities of the human operator to detect signals embedded in noise are described and illustrated. In addition to illustrating displays to study the effects of various signal and display parameters, pre-processing and real-time, operator-directed (via light pen) processing are also shown. The use of this system for tachistoscopic stimulus presentations to study basic human information processing capabilities is also described. (Author)
AD-819 269 HC$3.00 MF$0.65

VERBAL ESTIMATION OF DISTANCE IN A SIMULATED SPACE ENVIRONMENT.
Texas Christian Univ., Fort Worth.
M. D. Arnoult, B. R. Brown, S. Tees, and R. J. Vincent. 1967, 35p NASA-CR-73206
Contract NAS2-1481

Descriptors: *Distance, *Human performance, *Space environment simulation, *Visual perception, Errors, Estimating, Judgments.

For abstract, see STAR 06 10.
N68-19593 HC$3.00 MF$0.65

DISTANCE DISCRIMINATION IN A SIMULATED SPACE ENVIRONMENT.
Texas Christian Univ., Fort Worth.
M. D. Arnoult, B. R. Brown, and R. J. Vincent.
5 Jan 68, 17p NASA-CR-73205
Contract NAS2-1481

Descriptors: *Space environment simulation, *Space perception, *Stereoscopic vision, *Visual acuity, Display devices, Human factors engineering, Visual fields, Visual perception.

For abstract, see STAR 06 10.
N68-19705 HC$3.00 MF$0.65

RESEARCH ON NEW TECHNIQUES FOR THE ANALYSIS OF MANUAL CONTROL SYSTEMS PROGRESS REPORT, 16 JUN. - 15 DEC. 1967.
University of Southern Calif., Los Angeles. Electronic Sciences Lab.
G. A. Bekey. Jan 68, 14p NASA-CR-93766, USCEE-262
Contract NGR-05-018-022

Descriptors: *Data sampling, *Human factors engineering, *Manual control, *Operator performance, Adaptation, Aerodynamics, Data acquisition, Failure, Ibm computers.

For abstract, see STAR 06 10.
N68-19930 HC$3.00 MF$0.65

CROSS-VALIDATION OF A BRIEF VESTIBULAR DISORIENTATION TEST ADMINISTERED BY A VARIETY OF PERSONNEL.
Naval School of Aviation Medicine, Pensacola, Fla.
R. K. Ambler, and F. E. Grudy, Jr., 24 May 67, 7p NASA-CR-93836, NAMI-1009
NASA ORDER R-93

Descriptors: *Coriolis effect, *Pilot selection, *Vestibular tests, Data correlation, Disorientation, Human reactions, Motion sickness, Physiological responses, Vertigo.

For abstract, see STAR 06 10.
N68-20125 HC$3.00 MF$0.65

MEASUREMENT AND DISPLAY OF CONTROL INFORMATION. REMOTE MANIPULATION AND MANUAL CONTROL PROGRESS REPORT, 1 APR. - 30 SEP. 1967.
Massachusetts Inst. of Tech., Cambridge. Engineering Projects Lab.
W. R. Ferrell, and T. B. Sheridan. 30 Sep 67, 28p
NASA-CR-93853, DSR-70283-6
Grant NSG-107-61

Descriptors: *Feedback control, *Human performance, *Man machine systems, *Optimal control, Adaptive control, Computer programs, Display devices, Heuristic methods, Human factors laboratories, Optimization.

For abstract, see STAR 06 10.
N68-20453 HC$3.00 MF$0.65

THE OVERTURNING OF CARS AS A RESULT OF SEVERE BRAKING,
Road Research Lab., Crowthorne (England).
For primary bibliographic entry see Field 13L.
PB-177 896 HC$3.00 MF$0.65

A STUDY OF THE ADAPTABILITY OF THE AUTOMOBILE TO AUTOMATIC CONTROL,
Ohio State Univ., Columbus. Engineering Experiment Station.
For primary bibliographic entry see Field 13F.
PB-178 056 HC$3.00 MF$0.65

5I. Personnel Selection, Training, and Evaluation

THE EFFECTIVENESS OF DIFFERENT TRAINING METHODS.
Staff memo.,
George Washington Univ., Alexandria, Va. Human Resources Research Office.
Robert S. Beecroft. Sep 55, 28p
Contract DA-44-188-ARO-2

Descriptors: (*Students, *Teaching methods), Training, Military personnel, Education, Learning, Transfer of training, Performance (Human), Effectiveness, Training films, Aptitude tests, Retention.

This staff memorandum reviews the results of objective investigations of the effectiveness of different training methods in school situations. This review is restricted, with new exceptions, to studies using high school students, college students or military personnel in situations where the instructional aim is to inform SS of facts or principles in some subject matter. The review is primarily of the literature on training methods since 1940. The principal conclusions are: (1) though some lessons are learned better under one overall method of presentation than another (e.g. some lessons are best presented by film, others by lecture, etc.) over variegated subject matter there is no clear evidence of superiority of one method of presentation, (2) Effective instruction seems to depend largely on factors that are internal to a lesson rather than being dependent on method of presentation. Such factors as repetition of points within a lesson, telling students specifically what they are to learn, summaries of the principal points, etc. are apt to produce effective instruction. Recommendations for research in classroom learning made to fill in the principal gaps in our knowledge include research on the conduct of practical exercise and laboratory instruction, and study of the effect of conceptual and informational type instruction on later performance in practical situations. (Author)
AD-480 457 HC$3.00 MF$0.65

ORGANIZING THE PRESENTATION OF CONCEPTS IN EDUCATION AND TRAINING: THE LATTICE TECHNIQUE.
Research memo.
George Washington Univ., Alexandria, Va. Human Resources Research Office.
Nov 62, 18p

Descriptors: (*Training devices, *Education), Learning, Training, Reasoning, Diagrams, Decision making.
Identifiers: Lattice technique.

Information presented to the learner in education and in training often consists of sets of terms which represent interrelated concepts. In organizing the presentation of these terms and concepts, the developer of a particular curriculum may or may not consciously employ a rationale. An object of this paper is to offer a technique which may be used for ordering the sequence of presentation of conceptual subject matter so as to explicate relationships. The lattice technique is also conceived to be more than a device for formally depicting conceptual relationships. It may serve as a vehicle for experimentation on the arrangement of instructional subject matter. The use of the lattice by the learner during his instruction may be valuable, too, as an orientational aid.
AD-480 548 HC$3.00 MF$0.65

REALISTIC TARGETS FOR THE TRAINING AND TESTING OF COMBAT RIFLEMEN.
Staff memo.,
George Washington, Univ., Alexandria, Va. Human Resources Research Office.
Howard H. McFann, John E. Taylor, Seward Smith, and John A. Hammes. Apr 55, 36p
Report on Experimental Development of Training Methods and Proficiency Tests for Improving the Effectiveness of Combat Riflemen.

Descriptors: (*Army training, *Firing tests (Ordnance)), (*Army personnel, *Military training), Rifles, Small arms, Training devices, Targets, Motion, Design, Human engineering, Performance (Human), Effectiveness, Tactical warfare, Simulation.

The development of realistic targets was included as an essential phase of Task TRAINFIRE: Experimental Development of Training Methods and Proficiency Tests for Improving the Effectiveness of Combat Riflemen. As a result of this target development program, two devices were designed and produced. One is a remotely controlled, stationary target device which is electrically raised and lowered and falls when struck by a bullet; the other is a hand-powered, moving target device which is mechanically raised and lowered but does not fall when hit.
AD-489 296 HC$3.00 MF$0.65

CHARACTERISTICS OF THE TECHNICAL MILITARY OFFICER.
Management analysis note,
Office of the Director of Defense Research and Engineering Washington D C Office for Lab Management
E. M. Glass, E. J. Davis, M. Gussow, and H. F. Magill. 30 Jan 68, 17p Rept no. ODDRE-MAN-68-4

Descriptors: (*Officer personnel, Statistical data), Military personnel, Civilian personnel, Technicians, Education, Professional personnel, Personnel management, Tables.

The general characteristics of the military R and D officer are described. Differences among the Army, Navy and Air Force samples are significant in regard to age, rank and degree level. The composite military sample, a Federal sample and an industrial sample are also compared. The composite military sample is the youngest of the three. Although the percentage of its doctorates is about half that of the Federal sample, it includes a larger percentage of professionals with advanced degrees (M.S. and Ph.D.) than either the Federal or the industrial samples. Degree specialties are distributed similarly in all three samples--military, Federal and industrial. (Author)
AD-667 900 HC$3.00 MF$0.65

PRELIMINARY VALIDITY REPORT OF THE MOS EVALUATION TEST FOR SINGLE-ENGINE SINGLE-ROTOR HELICOPTER MAINTENANCE CHIEF MOS CODE 67R40,
Army Enlisted Evaluation Center Indianapolis Ind
Arthur G. Hermansen. Jan 68, 34p Rept no. Technical Research Study-105

Descriptors: (*Maintenance personnel, Psychometrics), (*Psychometrics, Statistical analysis), Supervisory personnel, Army personnel, Effectiveness, Helicopters, Reliability, Statistical data, Correlation techniques, Analysis of variance, Military psychology.
Identifiers: Validity.

The present preliminary report furnished pertinent validity data for the MOS evaluation test for Single-Engine Single-Rotor Helicopter Maintenance Chief, MOS Code 67R40 which was administered in the August 1967 evaluation period. Statistical bases were provided to allow control, in test revision, over the evaluation test characteristics of mean, standard deviation, reliability and validity. The evaluation test characteristic of validity was given special attention. Increasing the validity of an evaluation test was considered at both the item and the test outline levels. The statistical rationale and data necessary for this purpose were provided for the use of research psychologists in the Test Development branch of the US Army Enlisted Evaluation Center. (Author)
AD-667 969 HC$3.00 MF$0.65

STUDY, SURVEY OF HELICOPTER AND V/STOL AIRCRAFT SIMULATOR TRAINER DYNAMIC RESPONSE. VOLUME I. DYNAMIC RESPONSE CRITERIA FOR ROTARY WING AIRCRAFT FLIGHT TRAINERS.
Bell Aerosystems Co Buffalo N Y
For primary bibliographic entry see Field 1C.
AD-668 005 HC$3.00 MF$0.65

STUDY, SURVEY OF HELICOPTER AND V/STOL AIRCRAFT SIMULATOR TRAINER DYNAMIC RESPONSE. VOLUME II. DYNAMIC RESPONSE CRITERIA FOR V/STOL AIRCRAFT FLIGHT TRAINERS.
Bell Aerosystems Co Buffalo N Y
For primary bibliographic entry see Field 1C.
AD-668 006 HC$3.00 MF$0.65

NEW REGULATIONS REGARDING THE EQUIPMENT OF THE ARMED FORCES OF THE USSR,
Foreign Technology Div Wright-Patterson AFB Ohio
A. Grechko. 30 Jun 67, 28p Rept no. FTD-HT-67-208
Unedited rough draft trans. from Krasnaya Zvezda (USSR) 1p 7 Sep 1960, tr. by E. Harter.

Descriptors: (*Personnel management, Armed forces (Foreign)), (*Armed forces (Foreign), USSR), Military personnel, Prisoners, Morale, Officer personnel, Leadership, Logistics, Physical fitness, Military requirements.
Identifiers: Translations.

A military news article discusses a revision of the 1946 disciplinary and duty regulations set forth in 1960. The regulations now reflect changes in the composition of the armed forces and suggest a change in the role of military units in a nuclear war. Leadership is emphasized. Harshness in discipline is to be avoided. Reward and recognition are advocated as well as prompt and suitable punishment. New extension of disciplinary powers has been granted to commanders of regiments, certain naval vessels, and commanders of independently operating units. Specific conditions are laid down for the use of weapons against a violator of orders, such means to be used only in time of combat or in extreme cases during peacetime when no lesser force would suffice. In addition to the disciplinary regulation changes, updating and revision has been applied to the rules of internal service regulating the daily performance of duty. Emphasis is placed on the code of a soldier to avoid being taken prisoner. Such action can be condoned only in cases where the individual is helpless due to wounds or concussion. Improvement of morale is directed by various measures. Specific daily duty schedules for handling of equipment (heretofore published only for armor and transport equipment) have been expanded to include other types of equipment. In conclusion, more attention has been devoted to health measures. (Author)
AD-668 017 HC$3.00 MF$0.65

THE ROLE AND CAREER DEVELOPMENT OF THE SCIENTIFIC AND ENGINEERING OFFICER IN THE AIR FORCE,
Stanford Research Inst Menlo Park Calif
Howard M. Vollmer, and William C. Pedersen.
Jan 66, 86p
AFOSR-68-0494
Contract AF 49 (638)-1471
Report on R and D Studies Series.

Descriptors: (*Air force personnel, Personnel management), (*Scientific personnel, Air Force), (*Engineering personnel, Air Force), Recruiting, Officer personnel, Management engineering, Attitudes, Performance (Human), Decision making, Leadership.

This is a revision of a special report based in part on data obtained during a two-year study (1963-1964) of the Applications of the Behavioral Sciences to Research Management, AD-609 356, for the Office of Aerospace Research, USAF. It was published in 1966 and is being released in this form to make it available to a wide audience of management and social science personnel. Chapter II draws on studies of the US defense establishment to show how it is becoming a military technology management organization. Chapter III reviews findings of studies of various technology management organizations, and emphasizing the key importance of technology management generalities in an integrating role in them. The remaining chapters concern themselves with the Air Force situation when the data were collected. (Author)
AD-668 077 HC$3.00 MF$0.65

I CAME, I SAW, I RESPONDED: NURSING OBSERVATION AND ACTION SURVEY,
Walter Reed Army Inst of Research Washington D C
Phyllis J. Verhonick, Glennadee A. Nichols, Beverly A. K. Glor, and Rosemary T. McCarthy.
1968, 7p
Availability: Published in Nursing Research, v17 n1 p1-7 Jan-Feb 1968.

Descriptors: (*Manpower studies, Nurses), (*Nurses, Reaction (Psychology)), Training films, Simulation, Medical research, Performance (Human), Analysis, Data processing systems, Professional personnel, Motivation, Collecting methods, Statistical processes.

The purpose of the observation and action study was to examine the responses of a large and diverse sample of professional nurses to filmed patient situations. (Author)
AD-668 287 Not available from CFSTI.

MULTI-DIMENSIONAL AND DYNAMIC ASSIGNMENT MODELS WITH SOME REMARKS ON ORGANIZATION DESIGN.
Research rept.,
Carnegie-Mellon Univ Pittsburgh Pa Management Sciences Research Group
A. Charnes, W. W. Cooper, and A. Stedry. Mar 68, 24p Rept no. RR-124
Contracts Nonr-760 (24), N00014-66-C-0173
Prepared in cooperation with Northwestern Univ., Evanston, Ill. Systems Research Group, under contracts Nonr-1228 (10), and DA-31-124-ARO (D)-322, report no. SRM-197.

Descriptors: (*Personnel management, Mathematical models), Management planning, Linear programming, Job analysis, Optimization, Scheduling.
Identifiers: Assignment models, Vector optimization, Vocational guidance, Organization design.

The assignment model of linear programming is here extended to allow for dynamic interactions between assigned personnel and positions in each of a variety of possible measures and approaches are explored. These extensions are accompanied by additional remarks and interpretations which are intended to point toward further possible developments that might ultimately open avenues for new approaches to organization design and personnel placement. (Author)
AD-668 326 HC$3.00 MF$0.65

THE STRONG VOCATIONAL INTEREST BLANK IN PREDICTING NROTC OFFICER RETENTION: PART II. FAKABILITY.
Final rept.,
Naval Personnel Research Activity San Diego Calif
Norman M. Abrahams, Idell Neumann, and William H. Githens. Feb 68, 16p Rept no. NPRA-STB-68-9
See also Part 1, AD-666 564.

Descriptors: (*Officer personnel, Selection), Recruiting, Naval personnel, Motivation, Predictions, Reliability, Questionnaires, Statistical analysis.
Identifiers: *Strong vocational interest blanks, SVIB (Strong Vocational Interest Blank).

Since 1964, the Strong Vocational Interest Blank (SVIB) has been administered to NROTC (Regular) applicants. Inasmuch as retention scale scores from the SVIB are used in selection, it was essential to assess this scale's fakability. A great deal of civilian research has indicated the SVIB to be of value in predicting occupational tenure. In addition, recent research at this activity on this instrument has indicated its value in predicting naval officer tenure. The responses of several groups of subjects administered the SVIB under a variety of conditions were contrasted. A scale reflecting differences between standard and faked responses was constructed and applied to a variety of NROTC samples for comparison. Under instructions to do so, some individuals can increase their scores by faking. However, for NROTC applicants it appears that while there is a slight tendency for applicants to fake responses, as measured by a fake detection scale, there is very little actual gain on the retention scale itself. It was recommended that since faking does not appear to be a serious problem, the use of the SVIB career retention scale be continued in officer selection. (Author)
AD-668 331 HC$3.00 MF$0.65

LIST OF CRITICAL OCCUPATIONS FOR SCREENING THE READY RESERVE.
Department of Labor Washington D C
Sep 61, 28p

Descriptors: (*Armed Forces reserves, Job analysis), Classification, Maintenance personnel, Operators (Personnel), Professional personnel, Supervisory personnel, Technicians, Military requirements.

Each service screens its ready reserve on a continuing basis in order to provide a Ready Reserve composed of individuals who meet service standards for fitness and military qualifications and who are immediately available for active military service during a national emergency. Such screen- community hardship, as well as the need for the minimum necessary impact on the defense-supporting economy during mobilization. (Author)
AD-668 363 HC$3.00 MF$0.65

DISPLAYS FOR STUDYING SIGNAL DETECTION AND PATTERN RECOGNITION,
General Dynamics Corp., Groton, Conn. Electric Boat Div.
For primary bibliographic entry see Field 5H.
AD-819 269 HC$3.00 MF$0.65

MEDITSINSKAYA GAZETA CONFERENCE IN SVERDLOVSK ON PROBLEMS OF YOUNG MEDICAL SCIENTISTS.
Joint Publications Research Service, Washington, D. C.
24 Jan 68, 10p
Trans. from Meditsinskaya Gazeta (USSR) p3 12 Dec 67.

Descriptors: (*Medical personnel, USSR), Symposia, Selection, Education, Students.

The problems of the selection and creative development of the young scientific personnel, the interrelations of seniors and juniors, the rights and obligations of junior scientific collaborators are discussed.
JPRS-44127 HC$3.00 MF$0.65

SCIENTIFIC ACHIEVEMENTS OF STATE PRIZE WINNERS, PROF. TATYANA VINOGRADOVA AND PROF. ARSENII RUSTAKOV,
Joint Publications Research Service, Washington, D. C.
V. Petrova. 1 Feb 68, 5p
Trans. from Meditsinskaya Gazeta (USSR) p3 1 Jan 1968.

Descriptors: (*Medical personnel, Awards), USSR.
JPRS-44224 HC$3.00 MF$0.65

THE SHORTAGE OF SCIENTISTS AND ENGINEERS.
Washington Univ., St. Louis, Mo. Dept. of Economics.
H. Folk. Feb 68, 387p NASA-CR-93776
Grant NSG-342
Seri- Its Working Paper No. 6802

Descriptors: *Employment, *Labor, *Scientists, Economics, Industries, Occupation, Personnel selection, Qualifications, Resources.

For abstract, see STAR06 10.
N68-20483 HC$3.00 MF$0.65

METHODOLOGY FOR PROJECTION OF OCCUPATIONAL TRENDS IN THE DENVER STANDARD METROPOLITAN STATISTICAL AREA,
Colorado Univ., Boulder. Bureau of Economic Research.
Leslie Fishman, William E. Roberts, Charles M. Franks, and William W. McCormick. Mar 66, 208p
Contract DL-MDTA-42-64
Second Revision.

Descriptors: (*Employment, Mathematical prediction), (*Economics, Employment), Labor, Industries, Education, Distribution, Population, Urban areas, Colorado, Job analysis, Classification, Statistical analysis, Wages, Training.

The report reviews the various methods available for a projection of occupational requirements of an SMSA (Standard Metropolitan Statistical Area) the data available to implement the approaches, and recommends 'best' methods for use in both methodology and in data collection. Appendix I reviews the literature on employment projections and also the data available for making these projections in the Denver SMSA. Appendix II develops and applies a method for occupational projections for Denver SMSA using the matrix tool. William E. Roberts was primarily responsible for Appendix I; Charles M. Franks and William W. McCormick were primarily respons le for Appendix II. Two 'naive' models are recommended for use as benchmarks against which to compare the more sophisticated approaches -- the 'no change' model (A) and a model where the SMSA change is assumed to be the same as the national change (B). Four sophisticated models are considered: (C) the historical, where the SMSA is considered so different from the U. S. or other SMSA's that it must be treated as a separate, unique entity; (D) the 'ideal' type model, where industries are grouped into significant categories (e.g., primary, secondary, tertiary); (E) the method that stresses occupational groupings (e.g., white collar, blue collar, service, and farm workers) and (F) the method that relates the SMSA to the national economy. (Author)
PB-177 325 HC$3.00 MF$0.65

RETRAINING AND MIGRATION AS FACTORS IN REGIONAL ECONOMIC DEVELOPMENT,
Wisconsin Univ., Madison. Industrial Relations Research Inst.
For primary bibliographic entry see Field 5C.
PB-177 499 HC$3.00 MF$0.65

COMPUTER-BASED JOB MATCHING SYSTEMS: AN EXPLORATION OF THE STATE OF THE ART AND THE PROPOSED NATIONWIDE MATCHING SYSTEM,
Massachusetts Inst. of Tech., Cambridge.
Frazier Kellogg. 1967, 326p
Grant DL-91-23-67-11

Descriptors: (*Manpower studies, Data processing systems), State-of-the-art reviews, Computers, Computer personnel, Employment, United States Government, Education, Industrial relations, Personnel management, Symposia.
Identifiers: Job matching systems.

In its report to the President and the Congress, the National Commission on Technology, Automation, and Economic Progress recommended '. . . that a computerized nationwide service for matching men to jobs be established.' Such a service was expected to improve and extend labor market information, and thereby help to reduce unemployment and underemployment. But even as the Commission advanced the proposal, companies, professional associations, and public organizations had started to design and operate a variety of computer-based 'matching systems.' In short, many systems, local and national in scope, and internally as well as externally oriented to labor markets were operating or in advanced stages of design. In the spring of 1966, the United States Employment Service awarded a contract to a consulting firm for help in designing a national system and in developing several operational pilot projects. Against this background a two-day workshop was planned. It was intended to accomplish several purposes. First it would bring together people involved in the operation and design of a variety of different kinds of matching systems to describe what they were doing. Second, the workshop was planned to bring the 'doers' in matching systems operation and design together with people from the academic community with backgrounds in manpower research -- especially the operation and structure of both internal and external labor markets. This report is the product of the workshop. (Author)
PB-177 563

THE STRUCTURE OF RELATED INSTRUCTION IN WISCONSIN APPRENTICESHIP PROGRAMS.
Doctoral thesis,
Wisconsin Univ., Madison.
James S. Crabtree. 1967, 284p
Grant DL-91-53-66-11

Descriptors: (*Personnel management, *Industrial training), Industrial relations, Employee relations, Employment, Job analysis, Labor unions, Management planning, Students, Instructors, Law, Teaching methods, Education, Learning, Transfer of training, Costs, Personnel, Wisconsin, Theses.
Identifiers: Apprenticeship training.

This research study investigated the structure of related instruction offered to apprentices in Wisconsin Vocational Schools. Major areas described included administrative relationships, trade programs, enrollment patterns, the structure of classes, curriculum, instructional staff, and cost of instruction. The design of the study was normative-descriptive with the intent being to describe the present status of this education process. As part of an effort to present constructive ways of improving related instruction, evaluations and judgments of the data were made where relevant.
PB-177 567 HC$3.00 MF$0.65

RETRAINING UNDER THE MANPOWER DEVELOPMENT TRAINING ACT: A STUDY OF ATTRIBUTES OF TRAINEES ASSOCIATED WITH SUCCESSFUL RETRAINING,
Michigan State Univ., East Lansing. School of Labor and Industrial Relations.
Sigmund Nosow. 1967, 441p
Contract MDTA-9-63

Descriptors: (*Retraining, Statistical analysis), Sociology, Motivation, Psychology, Urban areas, Manpower studies, Aptitude tests, Employment, Teaching methods, Personnel, Education, Instructors, Students, Labor, Attitudes, Anthropology, Michigan, Questionnaires.

The particular set of studies reported here deals with some of the sociological, social-psychological, and psychological characteristics of persons who have entered selected Manpower Development and Training programs in Michigan during a period of approximately eighteen months from the latter part of 1963 through the early part of 1965, and how these characteristics are related to particular training outcomes. In addition, analyses have been undertaken to relate the types of courses and the community setting in which the courses are offered to some of the training outcomes.
PB-177 870 HC$3.00 MF$0.65

MID-AMERICA INDUSTRIAL DISTRICT PRYOR, OKLAHOMA. VOLUME I. GENERAL DEVELOPMENT PLAN.
Hudgins, Thompson, Ball and Associates, Inc., Oklahoma City, Okla.
For primary bibliographic entry see Field 5C.
PB-177 885 HC$3.00 MF$0.65

GENERAL DEVELOPMENT PLAN MID-AMERICA INDUSTRIAL DISTRICT PRYOR, OKLAHOMA. VOLUME 2. APPENDIX.
Hudgins, Thompson, Ball and Associates, Inc., Oklahoma City, Okla.
Jun 64, 104p
Contract CC-6029
See also Volume 1, PB-177 855. Prepared in cooperation with Development Planning Associates, Inc., Los Angeles and San Francisco, Calif., and The Pace Co., Houston, Tex.

Descriptors: (*Manpower studies, *Employment), Commerce, Research program administration, Urban areas, Rural areas, Agriculture, Wood, Ceramic materials, Metallurgy, Transportation, Petroleum, Industrial equipment, Statistical analysis, Industries, Periodic variations, Costs, Money, Government employees, Oklahoma, Kansas, Missouri, Arkansas, Texas.
Identifiers: MAID (Mid-America Industrial District), Area planning and development.

The tables set forth employment by major industrial category in the Mid-America Industrial District five-state regional and primary market area. They present growth trends from 1940 to 1962 and have been used in this report to evaluate the potentials and markets for various industries that might be considered as prospects for MAID. (Author)
PB-177 886 HC$3.00 MF$0.65

DEPARTMENTAL PERSONNEL PROCEDURES.
Agency for International Development, Washington, D. C. Communications Resources Div.
For primary bibliographic entry see Field 5A.
PB-177 951 HC$3.00 MF$0.65

SALES PROMOTION METHODS,
International Cooperation Administration, Washington, D. C. Technical Aids Branch.
For primary bibliographic entry see Field 5A.
PB-177 967 HC$3.00 MF$0.65

PERSONNEL MANAGEMENT. WAGE AND SALARY ADMINISTRATION (PART C. CONFERENCE LEADER'S GUIDE).
Agency for International Development, Washington, D. C. Communications Resources Div.
For primary bibliographic entry see Field 5A.
PB-177 976 HC$3.00 MF$0.65

PERSONNEL MANAGEMENT. PERSONNEL RECORDS AND STATISTICS.
Agency for International Development, Washington, D. C. Communications Resources Div.
For primary bibliographic entry see Field 5A.
PB-177 977 HC$3.00 MF$0.65

EDUCATION AND THE FEDERAL LABORATORIES: AN ASSESSMENT OF FEDERAL LABORATORY EDUCATIONAL ACTIVITIES AND THEIR PRESENT AND POTENTIAL RELATIONSHIPS WITH UNIVERSITIES.
Federal Council for Science and Technology, Washington, D. C. Committee on Federal Labs.
For primary bibliographic entry see Field 5K.
PB-178 018 HC$3.00 MF$0.65

SELECTED BIBLIOGRAPHY OF YUGOSLAV EDUCATIONAL MATERIALS, VOL. 3, NO. 2, 1967.
National Science Foundation, Washington, D. C. Special Foreign Currency Science Information Program.
1968, 59p SFCSI-HEW (TT-67-58042/2)

Descriptors: (*Education, Yugoslavia), Bibliographies, History, Management planning, Research program administration, Professional personnel, Instructors, Children, Adolescents, Adults, Technicians, Costs, Symposia, Standards, Statistical data, Retraining, Law.
Identifiers: Translations.

Contents: History of education; School reform; Teacher training and teaching staff; Preschool education; Elementary education; Secondary education; Adult education; Education of the hadicapped; Curricula and syllabi; Audio-visual aids; Problems in education; Management and financing; and Legislation.
TT-67-58042/2 HC$3.00 MF$0.65

5J. Psychology (Individual and Group Behavior)

FURTHER WORK ON THE USE OF TRACKING TASKS AS INDICATORS OF STRESS.
Final rept.,
Washington School of Psychiatry, D. C.
Fred Shectman, Elizabeth De Socio, and Norman K. Walker. Oct 64, 130p
Contract DA-49-193-MD-2369

Descriptors: (*Stress (Physiology), *Audiometry), (*Stress (Psychology), *Tracking), Job analysis, Psychometrics, Acceleration tolerance, Hearing, Performance (Human), Performance tests, Verbal behavior, Sensory deprivation, Motor reactions, Attention, Learning, Errors, Statistical data, Behavior, Reliability, Perception (Psychology).
Identifiers: Auditory shadowing.

This report presents data which shows that zero input tracking analysis provides a reliable measure of tracking performance, that tracking degrades severely under the stress of auditory shadowing but that the sensitivity of subjects differs considerably, as might be expected. It is also shown that auditory shadowing appears to produce similar effects to combat, possibly in both cases due to an information overload, and hence auditory shadowing may well be a suitable laboratory substitute for combat. Auditory shadowing can thus be used to define the sensitivity of any control system to combat degradation using a given group of subjects, or using a given system to examine the sensitivity of the subjects. Mild electric shocks on the other hand were quite ineffective stressors. (Author)
AD-450 861 HC$3.00

IMPRESSION FORMATION AS A MEASURE OF THE COMPLEXITY OF CONCEPTUAL STRUCTURE,
Purdue Univ Lafayette Ind
Siegfried Streufert, and Michael J. Driver. 1967, 17p
Research supported in part by ONR. Prepared in cooperation with Douglass College, New Brunswick, N. J. See also AD-659 962.
Availability: Published in Educational and Psychological Measurement, v27 p1025-39 1967.

Descriptors: (*Personality tests, *Test construction (Psychology)), Perception (Psychology), Predictions, Reliability, Analysis of variance, Attitudes, Social psychology, Behavior.

An alternative is presented to the sentence completion test, which was specifically designed to measure one kind of complexity only: perceptual social complexity. This measure is called the Impression Formation Test. In its original form it was first proposed by Streufert and Schroder (1963), but has since undergone considerable alteration in both administration and analysis. (Author)
AD-667 895 Not available from CFSTI.

NEW CORRELATION BETWEEN A HUMAN SUBJECT AND A QUANTUM MECHANICAL RANDOM NUMBER GENERATOR,
Boeing Scientific Research Labs Seattle Wash Plasma Physics Lab
Helmut Schmidt. Nov 67, 53p Rept no. D1-82-0684

Descriptors: (*Experimental design, Accuracy), (*Parapsychology, Statistical processes), (*Statistical processes, Measurement), (*Performance (Human), Correlation techniques), Probability, Random variables, Numbers, Statistical tests, Students.
Identifiers: Random number generators.

It is generally assumed that experiments involving statistical processes can always be designed in such a way that the outcome is independent of the experimenter. In order to test this basic assumption a series of experiments was performed with carefully designed apparatus whose central feature is a device utilizing a quantum process to generate random numbers modulo 4. The random number generator is connected to four lamps and four corresponding pushbuttons. Pressing any one of the four buttons triggers a quantum process and produces a random number, which is indicated by the lighting of one of the four lamps. The system is designed such that there should be no correlation between the number (1..4) of the button pressed and the number (1..4) of the lamp lighted, and furthermore, no correlation between successively generated random numbers. A large number of human subjects were asked to press the buttons manually with the objective in mind of obtaining a high number of coincidences (hits), i.e., events where the lamp next to the pressed button lights. From the results, it is tentatively concluded that there exists a weak but significant correlation between the statist al processes operative in these experiments and the experimenter who initiates the processes.
AD-667 953 HC$3.00 MF$0.65

PRELIMINARY VALIDITY REPORT OF THE MOS EVALUATION TEST FOR SINGLE-ENGINE SINGLE-ROTOR HELICOPTER MAINTENANCE CHIEF MOS CODE 67R40,
Army Enlisted Evaluation Center Indianapolis Ind
For primary bibliographic entry see Field 5I.
AD-667 969 HC$3.00 MF$0.65

AUTOKINESIS AND FELT EYE POSITION.
Technical rept. (Final),
Naval Training Device Center Orlando Fla
Stephen Jordan. Mar 68, 62p Rept no. NAVTRADEVCEN-IH-142

Descriptors: (*Visual perception, Illusions), (*Illusions, Motion), Vision, Eye, Theory, Experimental design, Statistical analysis, Tables.
Identifiers: *Autokinesis.

The experimental results indicate that autokinesis may be explained within the context of Duncker's theory of relative displacement. The nature of the displacement was found to be, in these experiments, a shift in the egocentric visual framework as mediated by felt rather than objective eye position. An explanation of the shift in felt eye position based on a change in afferent stimulation impinging on the eye is proposed. Implications of the theory for future research including an investigation of auditory autokinesis and felt head position are discussed. (Author)
AD-668 015 HC$3.00 MF$0.65

ESTIMATING ITEM CHARACTERISTIC CURVES WITHOUT KNOWLEDGE OF THEIR MATHEMATICAL FORM,
Educational Testing Service Princeton N J
Frederick M. Lord. Feb 68, 16p Rept no. RB-68-8
Contract Nonr-2752 (00)

Descriptors: (*Psychometrics, Statistical analysis), (*Distribution functions, Mathematical prediction), Intelligence tests, Curve fitting, Regression analysis, Statistical distributions, Sampling, Mathematical models, Performance (Human), Distribution theory, Correlation techniques.
Identifiers: Maximum likelihood, Item characteristic curves, Latent trait theory.

A method is outlined for estimating item characteristic curves without knowledge of their mathematical form. For illustrative purposes, the method is applied to five items from a regular test administration. Previously, curves had been estimated for these same items on the assumption that all were of logistic form. Surprising agreement was found between the results obtained from the two unrelated methods. (Author)
AD-668 024 HC$3.00 MF$0.65

EXPERIMENTS IN GROUP PREDICTION,
Rand Corp Santa Monica Calif
N. C. Dalkey. Mar 68, 14p Rept no. P-3820
Prepared for presentation at the National Meeting of the American Chemical Society held in San Francisco, Calif., 1-4 Apr 68.

Descriptors: (*Group dynamics, *Attitudes), (*Predictions, Accuracy), Problem solving, Decision making, Conformity, Questionnaires, Experimental design, Social psychology, Feedback, Reliability, Statistical analysis.
Identifiers: Delphi technique.

The usual way of using a group for the formulation of opinion is by way of face-to-face discussion in a committee, commission, or panel. A large number of recent investigations by social psychologists have demonstrated that face-to-face discussion has serious drawbacks. Chief among these are: influence of dominant individuals, noise, and group pressure toward conformity. To ameliorate some of these difficulties, a procedure called Delphi has been developed at RAND. This procedure has three basic features: (1) Anonymity; (2) controlled feedback; and (3) statistical group response. The results of these exercises are briefly summarized as follows: (1) In almost all cases, there is a pronounced convergence of opinion with iteration; (2) the principle decrease is between the first and second rounds; and (3) most significant, for those cases where the accuracy of responses can be checked, the accuracy of the group response increases with iteration. (Author)
AD-668 107 HC$3.00 MF$0.65

TESTING FOR EQUALITY OF MEANS, EQUALITY OF VARIANCES AND EQUALITY OF COVARIANCES UNDER RESTRICTIONS UPON THE PARAMETER SPACE (PRELIMINARY REPORT).
Johns Hopkins Univ Baltimore Md Dept of Statistics
For primary bibliographic entry see Field 12A.
AD-668 147 HC$3.00 MF$0.65

THE PARADOX OF VOTING: SOME PROBABILISTIC RESULTS.
Technical rept.,
Johns Hopkins Univ Baltimore Md Dept of Statistics
Leon Jay Gleser. Mar 68, 26p Rept no. TR-89
Contract Nonr-4010 (09)

Descriptors: (*Political science, Statistical analysis), (*Group dynamics, Decision making), Behavior, Probability, Mathematical models, Random variables, Analysis of variance, Approximation (Mathematics), Statistical distributions.

The 'paradox of voting' was discovered by Condorcet in the 18th century and has intrigued mathematicians, economists, and political scientists since then. Briefly, the paradox is that group decision processes which involve majority rule can lead to 'cycles' (circular preferences). Because it calls into question democratic methods of group decision making (and also has relevance to the construction of a social welfare function), the 'paradox of voting' is an important problem in the behavioral sciences. Recent work on the 'paradox of voting' has involved calculating the probability that a majority rule decision process cannot arrive at a preferred alternative in a situation where k alternatives are being considered by a randomly selected group of m=2n+1 members. It is assumed that the preference ordering of each individual in the group can be any one of the r=k factorial possible preference orderings (rankings) of the k alternatives -- the probability that the individual has ranking R sub alpha being p sub alpha, p sub alpha = or > 0, Summation alpha = 1 tor of p sub alpha = 1, alpha = 1, 2, ..., r. This paper is concerned with approximations to the probability of the paradox of voting in the case where the p sub alpha's can take on any value, and where m is large. (Author)
AD-668 154 HC$3.00 MF$0.65

UNDERWATER WORK MEASUREMENT TECHNIQUES: INITIAL STUDIES.
California Univ Los Angeles Biotechnology Lab
For primary bibliographic entry see Field 15G.
AD-668 180 HC$3.00 MF$0.65

CONSTANT ERRORS IN WEIGHT JUDGEMENTS AS A FUNCTION OF THE SIZE OF THE DIFFERENTIAL THRESHOLD,
Cambridge Univ (England) Psychological Lab
Helen E. Ross. 1968, 27p
Grant AF-EOAR-93-63

Descriptors: (*Perception (Psychology), Weight), Psychophysics, Errors, Illusions, Statistical analysis, Great Britain.

Constant errors in psychophysical procedures are known to increase in magnitude with the intensity of the standard, and with the temporal or spatial separation of the standard and comparison stimuli. It is often assumed that this is due to increasing 'adaptation' of the effective standard. It is argued here that the increase is due to a statistical artefact, since the measures of constant error and of differential threshold normally used are not independent, so that any factor which increases the difficulty of discrimination will increase the magnitude of the constant error. It is shown that for differential thresholds ranging from 1-25 gm the absolute size of the constant error increases with the size of the threshold, but the direction of the error is variable and remains unexplained. (Author)
AD-668 207 HC$3.00 MF$0.65

AUTONOMIC CORRELATES OF EYE MOVEMENT BURSTS DURING STAGE REM SLEEP,
Navy Medical Neuropsychiatric Research Unit San Diego Calif
For primary bibliographic entry see Field 6P.
AD-668 288 Not available from CFSTI.

EFFECTS OF STRESS, COMMUNICATION RELEVANCE AND BIRTH ORDER ON OPINION CHANGE.
Technical rept.,
Texas Univ Austin Dept of Psychology
Robert Helmreich, and John Hamilton. Mar 68, 15p Rept no. TR-6
Contract N00014-67-A-0126
Report on Human Reaction to Psychological Stress. See also Technical report no. 5, AD-668 334.

Descriptors: (*Stress (Psychology), Reaction (Psychology)), Attitudes, Fear, Social communication, Stimulation, Statistical analysis.

Subjects under high or low fear were presented with a communication: these under high fear showed significantly greater change on topics both relevant and irrelevant to the source of fear. There was a nonsignificant tendency for first-born Ss to show more change. Fear manipulation was confirmed by 2 stress measures, Mood Adjective Check List and Palmar Sweat Index. (Author)
AD-668 333 HC$3.00 MF$0.65

STUDIES IN FORCED COMPLIANCE. XIV. COMMITMENT AND MAGNITUDE OF INDUCEMENT TO COMPLY AS DETERMINANTS OF OPINION CHANGE.
Technical rept.,
Texas Univ Austin Dept of Psychology
Robert Helmreich, and Barry E. Collins. Jan 68, 22p Rept no. TR-5
Contract N00014-67-A-0126
Report on Performance and Adjustment Under Stress. See also Technical report no. 3, AD-650 310.

Descriptors: (*Attitudes, Social psychology), Stress (Psychology), Behavior, Conformity, Social communication, Motivation, Reaction (Psychology).

Subjects were enticed to record a strongly counterattitudinal statement about an important issue under three levels of commitment (anonymous audio recording, identified video recording with subsequent explanation or identified video recording with no opportunity to recant). 1/2 of the subjects were paid $.50 to make the recording; the other 1/2 were paid $2.50 for the counterattitudinal task. In the two higher commitment conditions (identified video recording), subjects given low financial inducement showed significantly more attitude change than those given the large reward. In the low commitment (anonymous audio recording) condition, large amounts of money produced more attitude change. (Author)
AD-668 334 HC$3.00 MF$0.65

OPINION CHANGE AS A FUNCTION OF STRESS AND COMMUNICATOR CREDIBILITY.
Technical rept.,
Texas Univ Austin Dept of Psychology
Harold Sigall, and Robert Helmreich. Nov 67, 21p Rept no. TR-4
Contract N00014-67-A-0126
Rept. on Human Reactions to Psychological Stress. See also Technical Report no. 3, AD-650 310.

Descriptors: (*Stress (Psychology), Reaction (Psychology)), Attitudes, Social communication, Social psychology, Analysis of variance.

An experiment, investigating the effects of audience stress and communicator credibility on opinion change was conducted. High and low stress and high-relevant, high-irrelevant, and low communicator credibility comprised a 2 X 3 factorial design. The nature of the stress was unrelated to the topic of the communication. Sixty subjects were randomly assigned to one of the six experimental conditions. It was predicted that differences in communicator credibility would lead to differences in opinion change under low stress and that under high stress, opinion change would not be affected significantly by differences in communicator credibility. The results supported these predictions. (Author)
AD-668 335 HC$3.00 MF$0.65

STUDIES OF BINAURAL INTERACTION.
Summary rept.,
Tracor Inc Austin Tex
Thomas R. Evans. 1 Apr 68, 56p Rept no. TRACOR-68-593-U
Contract Nonr-4193 (00)

Descriptors: (*Auditory perception, Reports), Psychoacoustics, Hearing, Auditory signals, Responses, Electrophysiology, Noise, Masking, Detection, Audiofrequency, Thresholds (Physiology).

Basic studies of binaural interaction were continued. The areas of research pursued concerned the determination of the 'critical bands' for antiphasic signals under various intensive conditions, the effect of signal duration on 'critical bands,' the effect of harmonic relations on the detection of signals of uncertain frequency, and the influence of various auditory parameters on the cortical evoked response. (Author)
AD-668 337 HC$3.00 MF$0.65

A DIRECTORY OF RESEARCH IN PSYCHOLOGY, PSYCHIATRY, NEUROLOGY, AND SOCIOLOGY SUPPORTED BY THE MEDICAL RESEARCH COUNCIL, UNITED KINGDOM,
Office of Naval Research London (England)
For primary bibliographic entry see Field 6E.
AD-668 346 HC$3.00 MF$0.65

THE PERCEPTION OF CURVATURE,
Toronto Univ (Ontario)
John Ogilvie, and Eva Daicar. 9 May 67, 5p
Research supported by Defense Research Board of Canada.
Availability: Published in Canad. J. /Psychol., v21 n6 p521-5 1967.

Descriptors: (*Visual perception, Curved profiles), Visual acuity, Illumination, Performance (Human), Thresholds (Physiology), Psychometrics, Canada.

Thresholds of curvature were determined for two chord lengths at three orientations--vertical, horizontal, and oblique. The radius of curvature at threshold was smaller for the shorter lines. Performance was about the same for horizontal and vertical lines but not as good for oblique lines. The sagitta or 'off-straightness' of the threshold curves varied between 2 and 4 sec. of arc at the eye. The problem of the appropriate measure of acuity is discussed. (Author)
AD-668 353 Not available from CFSTI.

TACHISTOSCOPIC RECOGNITION OF NUMBER SEQUENCES,
Waterloo Univ (Ontario)
M. P. Br en, A. O. Dick, and D. J. K. Mewhort. 1968, 8p
Availability: Published in Canad. J. Psycholol./ Rev. Canad. Psychol, v22 n1 p52-9 1968.

Descriptors: (*Recall, *Numbers), Memory, Geometric forms, Accuracy, Performance (Human), Canada.
Identifiers: Tachistoscopic recognition.

Accuracy and order of report of 6-digit number sequences were investigated under both free-recall and ordered-recall conditions. These data, when compared to previously published data for letters and forms, indicate that processing of numbers in the recognition task is more flexible than that of letters but less flexible than that of forms. It was concluded that while familiarity per se plays an important role, part of the polarization in the processing of letters results from unique properties of letters which reflect Ss reading experience. (Author)
AD-668 359 Not available from CFSTI.

A STUDY OF PEDESTRIAN RISK IN CROSSING BUSY ROADS IN FOUR TOWNS,
Road Research Lab., Crowthorne (England).
G. D. Jacobs, and D. G. Wilson. 1967, 31p RRL-LR106

Descriptors: (*Urban areas, *Traffic), (*Humans, *Accidents), Safety, Probability, Warning systems, Urban areas, Population, Great Britain, Statistical analysis, Performance (Human), Vehicles, Children, Adults, Males, Females, Traffic.
Identifiers: Traffic engineering, Pedestrians.

Comparisons were made of the numbers of pedestrians crossing specified roads and the numbers of pedestrian casualties on different lengths of approximately eight miles of road, in four towns of relatively equal population. A number of factors influencing the comparison were taken into account, including the presence or proximity of pedestrian crossings and their type, the age and sex of the pedestrians, the level of vehicular flow and the effect of one-way streets. The results of this study were compared with previous results obtained from surveys of pedestrian risk in a larger metropolitan area.
PB-177 897 HC$3.00 MF$0.65

EFFECT OF THE ADVISORY 'GIVE WAY' RULE AT UXBRIDGE CIRCUS ROUNDABOUT,
Road Research Lab., Crowthorne (England).
For primary bibliographic entry see Field 13B.
PB-177 900 HC$3.00 MF$0.65

TECHNIQUE FOR AREA PLANNING: A MANUAL FOR THE CONSTRUCTION AND APPLICATION OF A SIMPLIFIED INPUT-OUTPUT TABLE.
Regional Economic Development Inst., Inc., Pittsburgh, Pa.
For primary bibliographic entry see Field 5C.
PB-178 058 HC$3.00 MF$0.65

5K. Sociology

SOCIAL SCIENCE RESEARCH AND NATIONAL SECURITY,
Smithsonian Institution, Washington, D. C.
For primary bibliographic entry see Field 15C.
AD-437 464 HC$3.00

ON-LINE ANALYSIS FOR SOCIAL SCIENTISTS.
Technical rept. Nov 66,
Massachusetts Inst of Tech Cambridge
James R. Miller. May 67, 31p Rept no. MAC-TR-40
Contract Nonr-4102 (01), Grant NsG-235

Descriptors: (*Sociometrics, *Information retrieval), (*Subroutines, Libraries), Man-machine systems, Social sciences, Scientific research, Programming (Computers), Computer programs, Input-output devices, Test equipment, Theory, Training devices, Students, Statistical data, Analysis, Instruction manuals, Handbooks, Sequences.
Identifiers: *On-line computer routines.

A library of computer routines has been compiled to facilitate the analysis of social science research data. Many of these routines are designed to test statistical hypotheses. These routines are designed primarily for social science researchers who do not possess extensive prior training in mathematics, statistics, or computer operations. They provide a rapid, flexible, and immediately accessible method of testing preliminary hypotheses and hunches on small to intermediate amounts of data. They also provide a useful pedagogical tool for training students in practical data and analysis. (Author)
AD-668 009 HC$3.00 MF$0.65

THE POLITICAL ECONOMICS OF SOCIAL RESEARCH: THE CASE OF SOCIOLOGY.
Interim rept.,
Bureau of Social Science Research Inc Washington D C
Albert D. Biderman, and Elisabeth T. Crawford. Mar 68, 126p
AFOSR-68-0579
Contract AF 49 (638)-1344

Descriptors: (*Social sciences, Budgets), (*Sociology, Scientific research), Federal budgets, Economics, Education, Professional personnel, Universities, History.

An analysis is presented of the ways in which economic allocations to sociological research affect the organization of the field and the problems with which it is concerned. Given the public value character of sociological research, political-economic models are those applied. Establishing allocations to sociological work confronts difficulties which are characteristic of any common-value, nondistributive economic activity; other difficulties more particularly characteristic of knowledge-production; yet others which are generally true of the social sciences; and some which are peculiar to sociology. The historical growth of the field is discussed in terms of modes by which the economic claims of sociology have been legitimated. Direct and indirect federal financial support has been of central and continually increasing importance. In its early forms, relations to government tended to move sociological activity in the direction of a cameralistic discipline, but more recent developments have strengthened its academic, theoretical, nomothetic orientations. The relations of the social sciences to the defense establishment in the Cold War period were instrumental in this shift of emphasis. Current and future developments in sociology are discussed in terms of changes and attenuations of the forms of political consensus which, in the past, structured the economic bases of the field. (Author)
AD-668 082 HC$3.00 MF$0.65

MATHEMATICAL PROGRAMMING AND ECONOMIC ANTHROPOLOGY.
Technical rept. no. 1, 1 Jan 67-30 May 68, on Comparative Econometrics Project,
Texas Univ Austin Dept of Anthropology
Ira R. Buchler, and J. R. McGoodwin. 24 Apr 68, 47p
Contract N00014-67-A-0126

Descriptors: (*Anthropology, Mathematical models), Economics, Decision making, Mathematical programming, Uncertainty, Probability, Algorithms, Game theory, Agriculture, Social psychology, Behavior, Culture.

The document presents (1) A brief introduction to mathematical programming and the theory of convex bodies (for economic anthropologists); (2) A discussion of decision making under certainty, risk, and uncertainty; (3) A review of several algorithms for economic decision problems; (4) A general discussion of the diet problem and transportation method of linear programming; (5) A game theory and linear programming analysis of a 'Jamaican decision problem'; (6) A linear programming

analysis of agricultural decision processes; and (7) A general discussion of (one-person) games against nature. (Author)
AD-668 259 HC$3.00 MF$0.65

ISSUES IN SOCIAL SCIENCE DECISION-MAKING.
Final rept.,
Purdue Univ Lafayette Ind Dept of Sociology
Richard J. Hill. 29 Mar 68, 5p
AFOSR-68-0683
Contract AF 49 (638)-1764

Descriptors: (*Social sciences, Decision making), Symposia, Social communication.
Identifiers: Ethnomethodology.

The report summarizes the activities associated with a conference devoted to the methodological grounds for reaching decisions in social science. Eighteen social scientists participated in a two-day seminar devoted to an examination of the procedures recently advanced by Harold Garfinkel and his associates. This position, which has been labeled 'ethnomethodology,' raises a series of issues central to more established methodologies. Prior to the conference, participants received a set of seven papers describing in detail the ethnomethodological position. The conference proceedings were transcribed. (Author)
AD-668 262 HC$3.00 MF$0.65

WORK PROGRAM FISCAL YEAR 1968.
American Univ Washington D C Center for Research in Social Systems
Oct 67, 59p
Contract DAHC19-67-C-0046

Descriptors: (*Social sciences, Scientific research), (*Army operations, Social sciences), Military training, Armed forces (Foreign), Psychological warfare, Culture, Unconventional warfare, Counterinsurgency, Research program administration.
Identifiers: Civic action.

Contents: Preparation of U.S. military personnel for assignments in developing nations; Military civic action and community relations: military and cultural implications; U.S. defense operations in military assistance and psychological operations; Military forces of developing nations; Methodologies for research on foreign cultures; U.S. operations in unconventional warfare and internal defense and development; Social processes relevant to military planning for stability; Cultural Information Analysis Center.
AD-668 268 HC$3.00 MF$0.65

A DIRECTORY OF RESEARCH IN PSYCHOLOGY, PSYCHIATRY, NEUROLOGY, AND SOCIOLOGY SUPPORTED BY THE MEDICAL RESEARCH COUNCIL, UNITED KINGDOM,
Office of Naval Research London (England)
For primary bibliographic entry see Field 6E.
AD-668 346 HC$3.00 MF$0.65

METHOD AND SUBSTANCE IN CHANGE.
Carnegie-Mellon Univ Pittsburgh Pa Management Sciences Research Group
For primary bibliographic entry see Field 5A.
AD-668 488 HC$3.00 MF$0.65

SCIENTIFIC PROGRESS AND FACILITIES OF THE LATVIAN SSR,
Joint Publications Research Service, Washington, D. C.
For primary bibliographic entry see Field 13B.
JPRS-43944 HC$3.00 MF$0.65

EDUCATION AND THE FEDERAL LABORATORIES: AN ASSESSMENT OF FEDERAL LABORATORY EDUCATIONAL ACTIVITIES AND THEIR PRESENT AND POTENTIAL RELATIONSHIPS WITH UNIVERSITIES.
Federal Council for Science and Technology, Washington, D. C. Committee on Federal Labs.
Mar 68, 99p

Descriptors: (*Laboratories, *United States Government), (*Research program administration, *Personnel management), Reports, Management planning, Federal budgets, Scientific organizations, Education, Universities, Manpower studies, Scientific research.

This study was prepared by the Committee on Federal Laboratories of the Federal Council under the chairmanship of Dr. Allen V. Astin, Director of the National Bureau of Standards. It makes nine recommendations for extending collaborative relationships between government laboratories and universities, including stronger incentives and greater flexibility on the part of Federal laboratories in making their staffs and facilities available for teaching and research by students and faculty. The results of the Federal Council study led to the conclusion that the maintenance of a high level of competence and effectiveness in Federal laboratories requires a strong program for the continuing education and professional development of the technical staffs of the laboratories which can probably best be brought about through cooperative arrangements with available universities. It is also evident that Federal laboratories frequently possess special skills and unique or unusual facilities which can contribute effectively towards meeting the total educational needs of the Nation through cooperative arrangements with universities. The national effort to expand graduate education resources should take explicitly into account the potentialities of the Federal laboratories. Federal laboratories need the invigorating influence of graduate students and faculty members from colleges and universities.
PB-178 018 HC$3.00 MF$0.65

FEASIBILITY STUDY: INTERNATIONAL TRADE TOURIST - CONVENTION AND CULTURAL FACILITIES, LAREDO, TEXAS.
Caudill, Rowlett and Scott, Houston, Tex.
For primary bibliographic entry see Field 5C.
PB-178 019 HC$3.00 MF$0.65

6. BIOLOGICAL AND MEDICAL SCIENCES

6A. Biochemistry

ENZYMATIC ADAPTATION RELATED TO CARBOHYDRATE AND FAT METABOLISM IN ANIMAL BODY.
Rept. no. 6 (Final), 15 Mar 65-14 Mar 66,
Tokyo Biochemical Research Foundation (Japan)
Norio Shimazono. Mar 68, 34p
ARDG (FE)-J-184-6
Contract DA-92-557-FEC-37960

Descriptors: (*Carbohydrates, Metabolism), (*Fats, Metabolism), Enzymes, Tracer studies, Fatty acids, Adipose tissue, Glycogen, Placenta, Adaptation (Physiology), Sex hormones, Epinephrine, Chromatographic analysis, In vitro analysis, Japan.
Identifiers: Estradiol.

The conditions of free fatty acid release in vitro (effects of changes in ionic strength, hydrogen ion concentration and certain chemical reagents) were studied. Effects of pretreatment of specifically operated rats (hypophysectomized, thyroidectomized and adrenalectomized rat etc.) with hormone were studied. The classification of lipase was attempted. The effects of estradiol on glucogenesis and gluconeogenesis in early human placental tissue was investigated using glucose-U-C 14, -1-C 14, and -6-C 14. (Author)
AD-667 976 HC$3.00 MF$0.65

THE LOCALIZATION BY ELECTRON MICROSCOPY OF SEVERAL PHOSPHATASE ACTIVITIES IN HEPATOCYTES IN CASES OF INFECTIOUS OR SERUM HEPATITIS.
Progress rept.,
Nara Medical Coll Kashihara City (Japan)
Gonpachiro Yasuzumi. Mar 68, 12p
ARDG (FE)-FE-377-1
Grant DA-CRD-AFE-S92-544-68-G99

Descriptors: (*Ferritin, Microstructure), Liver, Phosphoric monoester hydrolases, Cell structure, Oxidoreductases, Infectious hepatitis, Serum hepatitis, Electron microscopy, Electron diffraction analysis, X-ray spectroscopy, Molecular structure, Japan.

It was observed that ferritin molecules are present in several patterns in hepatocytes in cases of serum or infectious hepatitis and hemosiderosis. Although production of ferritin molecules in the cells may be a specialized adaptative process, it is widely distributed through the human and animal kingdoms. It is of interest that the structure of ferritin molecules presents striking analogies to that of viruses. A ferritin molecule is composed of a protein shell, apoferritin, and a core consisting of inorganic ferric hydroxide. It is well known that viruses have shells of protein, and that they have distinct cores which contain nucleic acids. The physiological significance of the relationship between the ferritin iron and the xanthine oxidase (dehydrogenase) has been confirmed by Mazur and Carleton in the liver of the normal developing rats. Furthermore, several respiratory enzyme activities may be related to the presence of ferritin molecules. Therefore, prior to the observations on several enzyme activities of the hepatocytes in cases of serum hepatitis, ferritin patterns have been observed by means of electron microscope, x-ray microanalyzer and method of selected area microdiffraction. (Author)
AD-667 991 HC$3.00 MF$0.65

ENDOGENOUS MECHANISM OF VASCULAR RESPONSE IN INFLAMMATION, WITH SPECIAL REFERENCE TO BIOLOGIC SIGNIFICANCE OF SPECIFIC PERMEABILITY FACTORS AND THEIR INHIBITORS NEWLY ISOLATED FROM INFLAMED SITES.
Progress rept.,
Kumamoto Univ (Japan) Medical School
Hideo Hayashi. Dec 67, 8p
ARDG (FE)-J-287-3
Contract DA-92-557-FEC-39807

Descriptors: (*Blood vessels, *Permeability), Antigen-antibody reactions, Skin, Peptides, Peptide hydrolases, Chromatographic analysis, Labeled substances, Injection (Medicine), Burns, Pathology, Japan.
Identifiers: *Inflammation (Medicine), *Arthus phenomenon.

The mechanism of delayed and prolonged vascular permeability changes in inflammation was analysed in the form of chemical mediators. The first purpose was to ascertain the role of permeability factors of peptide nature, which were isolated from the inflamed sites and highly purified, in the permeability changes. The second purpose was to verify the relationship between the chemical structures and biologic actions of the factors. The third purpose was to confirm the biochemical mechanism of the production of the factors in vivo and in vitro. The observations will establish a new and fruitful way for essential understanding of inflammation. (Author)
AD-667 993 HC$3.00 MF$0.65

THE ANAESTHETIC PRESSURES OF CERTAIN FLUORINE-CONTAINING GASES,
Oxford Univ (England)
For primary bibliographic entry see Field 6O.
AD-668 007 Not available from CFSTI.

DISSOLUTION OF THE CONDENSED CHROMATIN STRUCTURES OF ISOLATED THYMOCYTE NUCLEI AND THE DISRUPTION OF DEOXYRIBONUCLEOPROTEIN (BY INORGANIC PHOSPHATE AND A PHOSPHOPROTEIN,
National Research Council of Canada Ottawa (Ontario) Div of Radiation Biology
J. F. Whitfield, and A. D. Perris. 10 Apr 67, 14p
NRC-9652
Availability: Published in Experimental Cell Research, v49 p359-72 1968.

Descriptors: (*Nucleoproteins, Decomposition), Phosphoproteins, Desoxyribonucleic acids, Cell structure, Nuclei (Biology), Thymus, Phosphates, Histones, Pathology, Radiobiology, Canada.
Identifiers: *Chromatin.

Phosvitin, a phosphoprotein, is able to severely disrupt deoxyribonucleoprotein (DNP) and thereby cause a large release of saline-soluble DNA from the saline-insoluble DNP isolated from normal rat thymocytes. This ability of phosvitin to disrupt DNP was reduced by calcium and magnesium ions. Equivalent amounts of inorganic phosphate (in the form of Na2HPO4) were unable to cause a similar large release of saline-soluble DNA from nucleoprotein. Both inorganic phosphate and the phosphoprotein caused the complete disappearance of the highly condensed deoxyribonucleoprotein (chromatin) structures in nuclei isolated from normal thymocytes. Condensed structures reappeared within these isolated nuclei when they were exposed to lysinerich histones. The support which these observations lend to current hypotheses on the roles of phosphate and phosphoproteins in the determination of the degree of condensation of nuclear chromatin structures in the whole cell under normal and pathological conditions is discussed. (Author)
AD-668 040 Not available from CFSTI.

CARBON DIOXIDE FIXATION IN MALARIA. II. PLASMODIUM KNOWLESI (MONKEY MALARIA),
California Univ Riverside Dept of Life Sciences
For primary bibliographic entry see Field 6C.
AD-668 276 Not available from CFSTI.

THE BIOCHEMISTRY OF THE ACUTE ALLERGIC REACTIONS,
Council for International Organizations of Medical Sciences Paris (France)
For primary bibliographic entry see Field 6E.
AD-668 295 Not available from CFSTI.

ENZYMATIC MECHANISMS CONCERNED IN THE COMPLEMENT INDUCED CHEMOTAXIS OF RABBIT POLYMORPHONUCLEAR LEUKOCYTES,
Walter Reed Army Inst of Research Washington D C
Elmer L. Becker, and Peter A. Ward. 1967, 10p
Availability: Published in Immunopathology, International Symposium on Mechanisms of Inflammation Induced by Immune Reactions (5th), p189-96 Punta Ala, Italy, Jun 67.

Descriptors: (*Enzymes, *Immunology), Blood chemistry, Complement, Leukocytes, Responses, Carboxylic ester hydrolases, Enzyme inhibitors, Amino acids, Aromatic compounds.
Identifiers: *Chemotaxis, *Inflammation (Pathology).

Chemotaxis of rabbit polymorphonuclear leukocytes induced by the activated trimolecular complex of C'5, C'6, C'7 (the chemotactic factor) has been studied by means of a modified Boyden chemotactic chamber. Phosphonate esters inhibit such chemotaxis. The inhibition takes place through the inactivation of two serine esterases required in chemotaxis. One of them exists in or on the cell in an already activated state. This 'activated esterase' has a particular affinity for acetate esters, and might be an acetylase or acetylesterase. The second esterase exists in or on the cell in an inactive form insusceptible to inhibition by the phosphonates. The chemotactic factor directly or indirectly transforms this esterase into an active enzyme susceptible to inhibition by the phosphonates. It is suggested that this latter 'activatable esterase' might be an enzyme with a particular affinity for aromatic amino acid derivatives. (Author)
AD-668 296 Not available from CFSTI.

CRYSTALLIZATION DURING POLYMERIZATION.
Rensselaer Polytechnic Inst Troy N Y Dept of Chemistry
For primary bibliographic entry see Field 7D.
AD-668 382 Not available from CFSTI.

HETEROGENEITY OF ANTIBODY TO ANTIGENIC DETERMINANTS OF POLYSACCHARIDES,
Columbia Univ New York Coll of Physicians and Surgeons
Elvin A. Kabat. 1968, 15p
Contract Nonr-266 (13), Grant NSF-GB-3675
Availability: Published in Nobel Symposium (3rd), Gamma Globulins Structure and Control of Biosynthesis, p207-20 n.d.

Descriptors: (*Antigens + antibodies, Biosynthesis), Polysaccharides, Gamma globulin, Antigen-antibody reactions, Chromatographic analysis, Electrophoresis, Stimulation, Responses, Amino acids, Molecular association, Immunity, Immune serums, Symposia.

The antibody formed in man even to relatively simple antigens consists of complex populations of molecules which may be heterogeneous with respect to almost any chemical, physical or immunological parameter. Nevertheless the antibody produced by each subject to any of the antigens often appears to consist of a somewhat selected population drawn from among the possible varieties of antibody molecules. There is a remarkable parallelism between the selective synthesis of myeloma globulins by the individual patient and of antibody by a normal subject. Thus purified human antidextran, antilevan and antiteichoic acid from many subjects have been found to be predominantly and often exclusively gamma G immunoglobulins but in some individuals some gamma A or gamma M antibody or both was found. Gamma A and gamma M antibodies tended to be more common in individuals immunized with blood group A substances. (Author)
AD-668 407 Not available from CFSTI.

UNIQUE FEATURES OF THE VARIABLE REGIONS OF BENCE JONES PROTEINS AND THEIR POSSIBLE RELATION TO ANTIBODY COMPLEMENTARITY,
Columbia Univ New York Coll of Physicians and Surgeons
Elvin A. Kabat. Feb 68, 7p
Contract Nonr-266 (13), Grant NSF-GB-3675
Prepared in cooperation with Presbyterian Hospital, New York, N. Y. Research supported in part by PHS.
Availability: Published in Proceedings of the National Academy of Sciences, v59 n2 p613-9 1968.

Descriptors: (*Proteins, Molecular structure), Amino acids, Antigen-antibody reactions, Genetics, Molecular association.
Identifiers: Bence Jones proteins.

Contents: Distribution of glycine in the variable region; Distribution of hydrophobic positions in the variable and constant regions; Implications of the subclasses of human-type K Bence Jones protein.
AD-668 412 Not available from CFSTI.

METABOLISM OF C 1 COMPOUNDS BY MICROORGANISMS, PART II.
Sheffield Univ (England) Dept of Microbiology
For primary bibliographic entry see Field 6M.
AD-668 463 HC$3.00 MF$0.65

SERUM CHEMISTRY VALUES FOR THE BEAGLE.
Armed Forces Radiobiology Research Inst Bethesda Md
For primary bibliographic entry see Field 6C.
AD-668 475 HC$3.00 MF$0.65

RESEARCH ACTIVITIES IN THE FIELD OF MATERIALS SCIENCE.
North Carolina Univ Chapel Hill Materials Research Center
For primary bibliographic entry see Field 11G.
AD-668 501 HC$3.00 MF$0.65

STUDIES IN MOLECULAR AND CELLULAR BIOPHYSICS,
Joint Publications Research Service, Washington, D. C.
I. A. Kuznetsov, O. Z. Korotkina, I. D. Volotovskii, M. S. Ashkinazi, and E. A. Liberman. 24 Jan 68, 105p
Trans. of Biofizika (USSR) v12 n3 p373-85, 421-32, 450-5, 535-46, 549-58, 567-72 1967.

Descriptors: (*Biophysics, *Cells (Biology)), Molecules, Molecular structure, Ions, Alkali metals, Desoxyribonucleic acids, Molecular association, Tryptophan, Tyrosine, Permeability, Membranes (Biology), Ultraviolet radiation, Mutations, Stereochemistry, Chemiluminescence, Cytochemistry, USSR.

Contents: Effect of alkali metal ions on DNA secondary structure -- Melting temperature and viscosity of various DNA salts; Light scattering study of conformation changes of DNA molecules in the process of heat denaturation; Investigation of the kinetics of low-temperature afterglow of tryptophan and proteins; Photooxidation of tyrosine sensitized by chlorophyll derivatives; Cation permeability of residual membranes; Effect of solution ion strength and some other factors on the kinetics of DNA denaturation during ultraviolet irradiation; Changes of nucleic acid solution pH during conformational transformations; Quantum chemical study of tautomerism of bases and nucleic acids and the problem of mutations; Electronic aspects of photodimerization of pyrimidine bases of nucleic acids; The role of denaturated molecules in DNA reaction with N-acetylethylenimine; UV light effect causing nucleic acid transformation; Possibilities of recording conformational transformations of catalase by the chemiluminescent method; Difference spectra of actin absorption in ultraviolet region; Study of superlow luminescence of blood plasma during malignant growth; The problem of biological memory.
JPRS-44129 HC$3.00 MF$0.65

MOLECULAR AND CELL BIOPHYSICS,
Joint Publications Research Service, Washington, D. C.
V. G. Tumanyan, M. V. Volkenshtein, M. I. Mekshenkov, I. I. Sapezhinskii, and S. L. Aksentsev. 24 Jan 68, 128p
Trans. of Biofizika (USSR) v12 n1 p5-21, 30-44, 63-72, 82-8, 97-103, 120-3, 157-9, 163-7 1967.

Descriptors: (*Biophysics, *Cells (Biology)), Amino acids, Ribonucleic acids, Molecular structure, Ionization, Peptides, Polymers, Chemiluminescence, Serum albumin, Aromatic compounds, Photolysis, Reproduction (Physiology), Nuclei (Biology), Nerve cells, Ions, Vibration, Erythrocytes, Freezing, Radiation effects, Cholinesterase inhibitors, USSR.

Contents: A study of the role of adenine-urcyl and guanine-cytozine in the formation of the secondary RNA structure; Systemization of codons; The theory of the ionization effect on the degree of alpha-helicity of polypeptides; The Cotton-Mouton effect theory for polymer solutions; A kinetic study of photochemical luminescence of serous albumin solutions; A study of primary photoproducts of aromatic amino acids at 80K using the impulse photolysis method; The motion of the phase separation in model and biological systems;

The possible significance of a free-radical mechanism in the regulation of cell reproduction; The contractile ability of cell nuclei; The rectifying properties of giant nerve cell membranes in solutions with varying ion composition; On the nature of the biological effect of vibration; The theory of the Cotton-Mouton effect in polymer solutions; X-ray analysis findings on human erythrocytes frozen in polyethylene oxide solutions; Inhibition of synaptic acetyl acetyl-cholinesterase by photostimulation of vitally dyed muscle.
JPRS-44136 HC$3.00 MF$0.65

A STUDY TO DETERMINE THE FEASIBILITY OF USING PHYSICAL METHODS FOR BIOCHEMICAL ANALYSIS UNDER SPACE FLIGHT CONDITIONS FINAL REPORT, 16 JAN. - 16 SEP. 1967.
Hayes International Corp., Birmingham, Ala.
16 Sep 67, 196p NASA-CR-93831, REPT.-1428
Contract NASW-1560

Descriptors: *Aerospace medicine, *Biochemistry, *Biometrics, *Chemical analysis, *Space flight stress, Bibliographies, Bioastronautics, Space laboratories.

For abstract, see STAR 06 10.
N68-20120 HC$3.00 MF$0.65

ACTA BIOCHIMICA POLONICA, VOL. 14, NO. 4, 1967.
National Science Foundation, Washington, D. C. Special Foreign Currency Science Information Program.
1967, 65p SFCSI-HEW-NLM (TT-67-56011/4)
Trans. of Acta Biochimica Polonica (Poland) v14 n4 1967. The above journal is translated on a regular basis.

Descriptors: (*Biochemistry, Reports), Trypsin, Enzyme inhibitors, Cereals, Seeds, Germination, Nucleotides, Ribosomes, Molecular association, Amino acids, Pancreas, Enzymes, Ribonucleic acids, Biosynthesis, Escherichia coli, Placenta, Electrophoresis, Mitochondria, Proteins, Poland.

Contents: Trypsin inhibitor from rye seeds; Synthetic polyribonucleotide attachment to bacterial ribosomes; Diketopiperazines, the non-assimilable components of pancreatic hydrolysates of protein for infusion; Translation process in the E. coli cell-free system in the presence of natural messenger RNA's; Separation and purification of soluble arylsulphatases of human placenta; The sodium - dependent effect of mitochondrial basic protein on energy metabolism in mitochondria.
TT-67-56011/4 HC$3.00

6B. Bioengineering

PHYSIOLOGICAL INSTRUMENTATION FOR FREE RANGING CHIMPANZEES.
Final rept. Jul 66-Oct 67,
Electro-Optical Systems Inc Pasadena Calif Biomedical Instrumentation Dept
R. H. Russell. Apr 68, 93p
ARL-TR-68-1
Contract AF 29 (600)-5755

Descriptors: (*Implants, Instrumentation), (*Chimpanzees, Implants), Sensors, Physiology, Oscillators, Telemeter systems, Very high frequency, Frequency modulation, Multiplex, Data transmission systems, Life expectancy.

Research and development necessary for the fabricating of four chronically implantable instruments is described. The complete instrument comprises conditioning for low level biopotential signals, temperature sensing, two subcarrier oscillators (IRIG channels No. 9 and 10), a VHF transmitter using FM/FM multiplexing with a range of 1200 feet, a remote switch to activate the instrument and a saturated mercury battery of 500 mAH capacity. The VHF receiving station, including the antenna, was supplied as part of the program. Prime design goals were met such as transmitting range, and IRIG and FCC compatability; the design goal for power consumption was bettered by more than two times to give a powered lifetime of more than 30 days. (Author)
AD-668 073 HC$3.00 MF$0.65

MICROCIRCULATION DYNAMICS.
California Univ San Diego La Jolla Dept of the Aerospace and Mechanical Engineering Sciences
For primary bibliographic entry see Field 6P.
AD-668 406 Not available from CFSTI.

INVESTIGATION OF PEROGNATHUS AS AN EXPERIMENTAL ORGANISM FOR RESEARCH IN SPACE BIOLOGY FINAL REPORT.
Northrop Corp., Hawthorne, Calif. Corporate Labs.
For primary bibliographic entry see Field 6C.
For abstract, see STAR 06 10.
N68-20016 HC$3.00 MF$0.65

CONDUCT STUDIES OF AUDITORY INFORMATION PROCESSING EMPHASIZING THE APPLICATION OF SIGNAL DETECTABILITY THEORY TO THE AUDITORY SENSORY RESPONSES SEMIANNUAL REPORT, 1 JUN. - 30 NOV. 1967, QUARTERLY STATUS REPORT, 1 SEP. - 30 NOV. 1967.
Texas Univ., Austin. Defense Research Lab.
L. A. Jeffress. 3 Jan 68, 44p NASA-CR-93854, QSR-14
Contract NASA ORDER R-129, NONR-3579/04/

Descriptors: *Auditory signals, *Binaural hearing, *Monaural signals, *Psychophysiology, *Signal processing, *Visual signals, Adaptation, Audiometry, Human reactions, Masking, Mathematical models, Psychometrics, Visual tasks.

For abstract, see STAR 06 10.
N68-20359 HC$3.00 MF$0.65

6C. Biology

ULTRASOUND BACKSCATTER IN FRESH AND THAWED ANIMAL TISSUE,
National Research Council of Canada Ottawa (Ontario) Div of Applied Physics
D. Makow, and M. Freese. 1968, 3p
NRC-9949
Prepared in cooperation with Fisheries Research Board of Canada, Winnipeg, Manitoba.
Availability: Published in Journal Fisheries Research Board of Canada, v25 n3 p605-7 1968.

Descriptors: (*Tissues (Biology), Ultrasonic radiation), Backscattering, Freezing, Fishes, Beef, Canada.

Values of velocity and absorption of high-frequency ultrasound in animal tissue can be correlated to some extent with the quality and composition of the tissue. Although this approach has received some attention, no effective inspection method based on measurements of these parameters has been developed to date. This is partly because measurements of these values require exacting conditions and precise instrumentation, such as an accurate time base, attenuator, and measurement cell. The authors have found that the backscatter of high-frequency ultrasound from beef and fish tissue differs markedly for fresh tissue and for tissue which has been frozen and then thawed. Initial tests have shown that the backscatter is highly dependent on the rate of freezing, and the number of times a sample has been frozen. (Author)
AD-668 050 Not available from CFSTI.

PHYSIOLOGICAL INSTRUMENTATION FOR FREE RANGING CHIMPANZEES.
Electro-Optical Systems Inc Pasadena Calif Biomedical Instrumentation Dept
For primary bibliographic entry see Field 6B.
AD-668 073 HC$3.00 MF$0.65

A SET THEORY APPROACH TO IMMUNOTAXONOMY: ANALYSIS OF SPECIES COMPARISONS IN MODIFIED OUCHTERLONY PLATES.
Final rept. 1 Apr 66-31 Oct 67,
Wayne State Univ Detroit Mich
G. William Moore, and Morris Goodman. Feb 68, 24p
6571-ARL-TR-68-2
Contract AF 29 (600)-5587, Grant NSF-GB-4823

Descriptors: (*Animals, Classification), Set theory, Computer programs, Immune serums, Antigens + antibodies, Immunology, Blood proteins.
Identifiers: *Immunotaxonomy, Ouchterlony plates.

The precipitin spurs formed in Ouchterlony comparisons of corresponding antigens in different species can be defined using the notation of set theory. A computer program based on this set theory definition can then be applied to Ouchterlony data so as to list the various species employed in the comparisons in order of increasing divergence from an homologous species. Such a computer program concisely captured conclusions, previously drawn in a more discursive manner, from data obtained with chicken and rabbit antisera to purified human serum proteins and produced results highly correlated with those of the more quantitative method of micro-complement fixation. (Author)
AD-668 128 HC$3.00 MF$0.65

GENETIC VARIATIONS AND PHYLOGENETIC PROPERTIES OF PROTEIN MACROMOLECULES OF CHIMPANZEES.
Final rept. 1 Apr 66-31 Oct 67,
Wayne State Univ Detroit Mich
Morris Goodman, and M. D. Poulik. Feb 68, 28p
6571-ARL-TR-68-3
Contract AF 29 (600)-5587

Descriptors: (*Chimpanzees, *Genetics), Proteins, Immunology, Electrophoresis, Enzymes, Primates, Humans, Morphology (Biology), Computer programs.

Computer programs for analyzing immunodiffusion and allelic data have been established. So far the immunodiffusion data (also electrophoretic and enzymatic data) on higher primate proteins reveal that the closest phylogenetic relatives of chimpanzee are man and gorilla; next comes the orangutan, and then the gibbons. Allelic data, particularly on transferrins, show a marked difference in genotypes between eastern (Congo; P. t. schweinfurthi) and western (Sierra-Leone, Liberia, Ghana; P. t. verus) chimpanzees, with the eastern chimpanzees also showing much higher genetic variability. At the submolecular level of immunoglobulins and red cell stromas differences and affinities between man and chimpanzee are being found. (Author)
AD-668 129 HC$3.00 MF$0.65

METHODS FOR STUDYING THE TIME COURSE OF CELL DIVISION IN CLONES FROM INDIVIDUAL L5178Y LEUKEMIA CELLS,
Naval Radiological Defense Lab San Francisco Calif
For primary bibliographic entry see Field 6R.
AD-668 164 HC$3.00 MF$0.65

NEMATODE PARASITES OF OCEANICA. II. REDESCRIPTION OF RICTULARIA WHARTONI TUBANGUI, 1931, AND NOTES ON OTHER SPECIES FROM PALAWAN, P. I.
Technical rept.,
Southwest Foundation for Research and Education San Antonio Tex
Gerald D. Schmidt, and Robert E. Kuntz. Dec 67, 8p
NAMRU-2-TR-302-Pt-2
Contract N00014-66-C-0094
See also Part I, AD-661 926. Prepared in cooperation with Colorado State Univ., Fort Collins. Dept. of Biology.

Availability: Published in The Journal of Parasitology, v53 n6 p1281-4 Dec 67.

Descriptors: (*Nematodes, Morphology (Biology)), Rodents, Parasites, Bats, Classification, Taiwan.

Rictularia whartoni Tubangui, 1931, is redescribed from the squirrel, Sundasciurus steerii juvencus (Gunther, 1876). Other species reported are Rictularia paradoxuri Tubangui and Masilungan, 1937, from the palm civet, Paradoxurus philippensis; Physaloptera maxillaris Molin, 1860, from the skunk, Mydaus marchei; Migonella sp. from the bat, Scotophilus temmnicki; Dipetalonema sp. and Trichuris sp. from the squirrel, S. steerii juvencus. All specimens were collected on Palawan, P. I. in 1962. (Author)
AD-668 203 Not available from CFSTI.

CARBON DIOXIDE FIXATION IN MALARIA. II. PLASMODIUM KNOWLESI (MONKEY MALARIA),
California Univ Riverside Dept of Life Sciences
Irwin W. Sherman, and Irwin P. Ting. 1968, 4p
Contract Nonr-1842 (07)
Prepared in cooperation with Stanford Medical School, Palo Alto, Calif. under contract DA-49-193-MD-2587. See also AD-665 268.
Availability: Published in Comp. Biochem. Physiol., v24 p639-42 1968.

Descriptors: (*Plasmodium, Metabolism), (*Parasitic diseases, *Carbon dioxide), Monkeys, Erythrocytes, Labeled substances, Amino acids, Radioactivity.

Plasmodium knowlesi-infected monkey erythrocytes fix more carbon dioxide than normal monkey red blood cells. Malaria-infected cells, incubated in the presence of $NaHC^{14}O_3$, show maximum amounts of radioactivity in aspartate, glutamate, lactate and citrate, whereas in the uninfected monkey erythrocytes the principally labelled compounds are glutamate and malate. (Author)
AD-668 276 Not available from CFSTI.

PHOTOPIC SPECTRAL SENSITIVITY IN THE RHESUS MONKEY,
Honeywell Inc St Paul Minn
Norman A. Sidley, and Harry G. Sperling. 1967, 4p
Contract DA-49-193-MD-2457
Availability: Published in Journal of the Optical Society of America, v57 n6 p816-8 Jun 1967.

Descriptors: (*Color vision, Monkeys), Sensitivity, Thresholds (Physiology), Vision, Adaptation (Physiology), Humans.

Photopic spectral-sensitivity data were obtained on two Rhesus monkeys and two human subjects. The data show peaks in the sensitivity functions near 600 nm, 530 nm, and 440 nm, and dips in sensitivity near 480 nm and 580 nm. The data indicate that the Rhesus monkey has photopic spectral sensitivity equivalent to that of man. (Author)
AD-668 319 Not available from CFSTI.

PHOTOTOPIC SPECTRAL SENSITIVITY IN THE MONKEY: METHODS FOR DETERMINING, AND INITIAL RESULTS,
Honeywell Inc St Paul Minn Systems and Research Div
N. A. Sidley, H. G. Sperling, E. W. Bedarf, and R. H. Hiss. 1965, 4p
Contract DA-49-193-MD-2457
Availability: Published in Science, v150 n3705 p1837-9 Dec 31 1965.

Descriptors: (*Color vision, Monkeys), Sensitivity, Vision, Adaptation (Physiology), Thresholds (Physiology), Humans.

Data were obtained on the spectral sensitivity of the light-adapted monkey by two operant conditioning techniques adapted to use with brief duration stimuli: cued avoidance conditioning, and a positive reinforcement-reaction time method. The results are compared with human photopic spectral sensitivity, and detailed similarities are found. (Author)
AD-668 320 Not available from CFSTI.

A SHARK-BITE METER,
Cornell Univ Ithaca N Y
James M. Snodgrass, and Perry W. Gilbert. 1967, 9p
Contract Nonr-401 (33)
Availability: Published in Sharks, Skates, and Rays, p331-7 1967.

Descriptors: (*Bites + stings, Measurement), (*Sharks, Bites + stings), Meters, Specifications, Design, Aluminum, Stainless steel, Calibration, Records, Mooring, Cables (Mechanical), Stresses.

Quantitative data on the capacity of a shark to inflict damage on both animate and inanimate objects are nonexistent. Quantitative data are essential from the engineering standpoint, since the magnitude of the forces must be known if we are to design shark-resistant cables and moorings. There are seven important specifications of a shark-bite meter, as follows: (1) The instrument must, first of all, be rugged and, insofar as possible, be immune to the effects of handling and the marine environment. (2) Simplicity of use is essential, and critical adjustment should not be required. (3) The design must permit use under relatively primitive field conditions. This requirement is interpreted in the broad sense to mean, at least initially, that a nonelectronic instrument would be preferable. (4) The instrument should require a minimum of attention before, during, and after the experimental periods. (5) A permanent record should be obtained. (6) The bite meter should not require critical orientation. (7) Shark-tooth damage should be minimized. (Author)
AD-668 348 Not available from CFSTI.

PRELIMINARY IN VIVO STUDIES ON PUPILLARY AND TAPETAL PIGMENT RESPONSES IN THE LEMON SHARK, NEGAPRION BREVIROSTRIS,
Cornell Univ Ithaca N Y
Karl P. Kuchnow, and Perry W. Gilbert. 1967, 15p
Contract Nonr-401 (33)
Availability: Published in Sharks, Skates, and Rays, p465-77 1967.

Descriptors: (*Sharks, Vision), Eye, Eye pigments, Retina, Adaptation (Physiology), Histology, Responses, Illumination, Thresholds (Physiology).

Using live lemon sharks and a technique designed to measure tapetal reflection in live animals, experiments were carried out to determine the adaptability of the tapetal apparatus with respect to both time and intensity of illumination. These reflection measurements were complemented by histological studies of eyes that had been light- or dark-adapted for varying periods of time, excised, preserved, and sectioned. (Author)
AD-668 349 Not available from CFSTI.

TOOTH REPLACEMENT IN THE LEMON SHARK, NEGAPRION BREVIROSTRIS,
Cornell Univ Ithaca N Y
Sanford A. Moss. 1967, 12p
Contract Nonr-401 (33)
Prepared in cooperation with Lerner Marine Lab., Bimini (Bahamas).
Availability: Published in Sharks, Skates, and Rays, p319-29 1967.

Descriptors: (*Sharks, Teeth), Growth, Aging (Physiology), Regeneration, Morphology (Biology), Calcification.

The tooth-replacement rates of the lemon shark, Negarprion brevirostris, upper- and lower-jaw teeth were measured by experimental clipping of teeth followed by the plotting of tooth movements. Lower-jaw teeth were replaced at an average rate of one tooth every 8.2 days in a single dental unit. Upper-jaw teeth were replaced at an average rate of one tooth every 7.8 days per dental unit. The rates of tooth replacement in starved lemon sharks were 10.0 days and 9.2 days for upper and lower jaws, respectively. By using the measured replacement rates, the growth rates of young lemon sharks were calculated by functional and replacement tooth measurements. Lemon sharks in their first year of growth were found to grow 10 cm of body length in about 40 days. An hypothetical growth curve for lemon sharks was estimated from the tooth-replacement data. This curve was then used to construct a tooth-replacement-rate curve for lemon sharks older than those experimentally measured. This curve is of an exponential form with replacement rate decreasing rapidly following maturity. The functional nature of elasmobranch tooth replacement and its consequences with regard to estimations of ancient shark populations is briefly discussed. (Author)
AD-668 350 Not available from CFSTI.

ELECTROENCEPHALOGRAPHIC STUDIES OF CHEMORECEPTION IN SHARKS,
Cornell Univ Ithaca N Y
E. S. Hodgson, R. F. Mathewson, and P. W. Gilbert. 1967, 13p
Contract Nonr-401 (33)
Prepared in cooperation with Columbia Univ., New York, Grant PHS-AI-02271, and Lerner Marine Lab., Bimini (Bahamas), Contract Nonr-552 (07).
Availability: Published in Sharks, Skates, and Rays, p491-501 1967.

Descriptors: (*Sharks, Electroencephalography), Chemoreceptors, Sensory perception, Electrophysiology, Stimulation, Sea water, Amino acids, Amines, Carbohydrates, Behavior, Swimming.

The study of chemoreception in elasmobranchs is only slowly progressing toward the levels of precision which can be attained with other experimental animals. Single-cell analysis still lies in the future, and future experiments will have to contend with the elaborate decoding of afferent impulse patterns which evidently come from many different chemoreceptor sites. As techniques improve, the chances of recording physiological functions closer to the primary receptor cells are also improved. Even with work in the brain, however, there are obvious lacks, such as a good atlas to permit precise sterotaxic localization of implanted electrodes. Of the pure chemicals tested thus far, the protein constituents and breakdown products--amino acids and amines--seem most prominent among the probable chemical cues for feeding, as with other marine animals. The present methods represent an approach to more precise and objective analyses of the chemical senses than can be done through field studies alone. (Author)
AD-668 351 Not available from CFSTI.

SERUM CHEMISTRY VALUES FOR THE BEAGLE.
Technical note,
Armed Forces Radiobiology Research Inst Bethesda Md
M. B. Cramer, C. L. Turbyfill, and W. A. Dewes. Dec 67, 17p Rept no. AFRRI-TN67-2

Descriptors: (*Blood chemistry, *Dogs), Blood serum, Serum albumin, Enzymes, Males, Females, Electrolytes (Physiology), Glucose, Cholesterol, Standards, Radiation injuries.

Normal values for 25 serum chemical components were determined for AKC registrable beagles. Analyses were performed on serum from 10 males and 10 females, and sex-related differences in the levels of the constituents were evaluated. The

serum levels of albumin, glutamic-oxalacetic transaminase, glutamic-pyruvic transaminase, and acid phosphatase were significantly higher ($p < .05$) in males than in females. For 21 other serum components, including electrolytes, glucose, cholesterol, nonprotein nitrogenous substances, and enzymes, no significant sex-related differences were found. (Author)
AD-668 475 HC$3.00 MF$0.65

EXPERIMENTAL INFECTION OF COYOTE PUPS WITH VENEZUELAN EQUINE ENCEPHALITIS VIRUS.
Dugway Proving Ground, Utah. Biological Div.
For primary bibliographic entry see Field 6M.
AD-804 069 HC$3.00 MF$0.65

A SPIRAL DESIGN FOR SPACE-STATION GREENHOUSES,
Joint Publications Research Service, Washington, D. C.
V. G. Chuchkin. 10 Jan 68, 25p
Trans. of Priroda (USSR) n10 p58-69 1967.

Descriptors: (*Photosynthesis, Space environmental conditions), (*Closed ecological systems, Space stations), Space biology, Systems engineering, Production, Efficiency, Effectiveness, Energy conversion, Mathematical analysis, Light, Life support, USSR.
Identifiers: Hydroponics, Spacecraft greenhouses.

It has been suggested that for long space flights the life support system should include a population of high order plants. These plants, in addition to the single celled algae, should provide the crew of the spacecraft with the vegetable portion of their rations, with oxygen and with water. In the creation of a light, compact spacecraft greenhouse the authors feel very sharply the necessity of solving the age old problem, with which many generations of botanists and agronomers have struggled, namely: the maximum increase in productivity of plants with the most economical expenditure of light energy. (Author)
JPRS-43943 HC$3.00 MF$0.65

HISTORY AND ACTIVITIES OF THE MORDOVSKII GAME AND FOREST PRESERVE,
Joint Publications Research Service, Washington, D. C.
For primary bibliographic entry see Field 2F.
JPRS-43988 HC$3.00 MF$0.65

TRANSMISSION OF THE TULAREMIA PATHOGEN TO HOMOTHERMAL ANIMALS BY IXODES TICKS,
Joint Publications Research Service, Washington, D. C.
K. I. Kondrashkina, A. D. Lukyanova, V. P. Chudesova, G. A. Kondrashkin, and G. M. Baraeva.
22 Jan 68, 15p
Trans. of Parazitologiya (USSR) v1 n5 p405-11 1967.

Descriptors: (*Disease vectors, Ticks), (*Pasteurella tularensis, Disease vectors), Penetration, Rodents, Infections, Bites + stings, Excretion, Skin, USSR.

Experiments confirm the opinion of Francis (1927) that Ixodes ticks infect homothermal animals with tularemia not through their salivary-mouth apparatus, but by their feces which in the process of blood-sucking penetrate into the bite-wounds of these Arthropoda. The cutaneous covers, as is the case with the salivary-mouth mechanism of transmission, are the main gateways for the penetration of the tularemia microbe into the organism of the animal-recipient. Percutaneous infection is considerably more effective than oral infection. The following factors are regarded as being most important in the high efficacy of the infection of the homothermal animals through the cutaneous covers. (1) In the course of the blood-sucking, ticks inflict deep wounds with, their proboscides with the result that the tularemia pathogen easily reaches and contaminates the blood stream, (2) Dermacentor marginatus ticks in the course of their blood-sucking excrete large quantities of feces which in infected ticks are infectious for they contain large quantities of tularemia microbes, (3) The greater probability of percutaneous infection as compared with oral infection is due to the fact that not every infected parasite is devoured by the host, but each attached tick contaminates the cutaneous covers of the host-feeder with its excreta. (Author)
JPRS-44105 HC$3.00 MF$0.65

MOLECULAR BIOLOGY AND THE PROBLEM OF DEVELOPMENT,
Joint Publications Research Service, Washington, D. C.
R. S. Karpinskaya. 6 Mar 68, 21p
Trans. of Voprosy Filosofii (USSR) n11 p99-110 1967.

Descriptors: (*Genetics, Biochemistry), Molecules, Adaptation (Physiology), Philosophy, USSR.
JPRS-44595 HC$3.00 MF$0.65

INVESTIGATION OF PEROGNATHUS AS AN EXPERIMENTAL ORGANISM FOR RESEARCH IN SPACE BIOLOGY FINAL REPORT.
Northrop Corp., Hawthorne, Calif. Corporate Labs.
R. G. Lindberg. Feb 68, 262p NASA-CR-93832
Contract NASW-812

Descriptors: *Biosatellites, *Exobiology, *Physiology, *Pocket mice, Circadian rhythms, Extraterrestrial environments, Life support systems, Metabolic wastes.

For abstract, see STAR 06 10.
N68-20016 HC$3.00 MF$0.65

FEASIBILITY STUDY FOR CONDUCTING BIOLOGICAL EXPERIMENTS ABOARD A PIONEER SPACECRAFT.
Northrop Corp., Hawthorne, Calif.
R. G. Lindberg. Feb 68, 250p NASA-CR-73178, NCL-68-10R
Contract NAS2-4491

Descriptors: *Bioinstrumentation, *Exobiology, *Experimental design, *Pioneer space probes, Bioengineering, Experimentation, Feasibility, Interplanetary spacecraft, Onboard equipment, Operations research, Space programs.

For abstract, see STAR 06 10.
N68-20346 HC$3.00 MF$0.65

UTILIZATION OF SOLAR ENERGY BY PLANTS. MEASUREMENT OF SOLAR RADIATION AND YIELD OF PHOTOSYNTHESIS.
l'Utilisation de l'Energie Solaire Par les Vegetaux. Mesure Du Rayonnement Solaire Et Du Rendement de La Photosynthese
Association Francaise pour L Etude Et le Developpement des Applications de L Energie Solaire, Paris.
1967, 70p
Lang- in French Conf- Symp. Held in Paris, 28 Sep. 1967

Descriptors: *Conferences, *Photosynthesis, *Solar energy, *Terrestrial radiation, Absorption spectra, Aerosols, Molecular diffusion, Plants (botany), Solar spectra.

For abstract, see STAR 06 10.
N68-20408 HC$3.00 MF$0.65

INSECTS FEEDING ON THE POLISH LARCH,
National Science Foundation, Washington, D. C. Special Foreign Currency Science Information Program.
Jan Jerzy Karpinski. 1967, 51p SFCSI-Agr (TT-66-57021)
Trans. of Instytut Badawczy Lesnictwa. Prace (Poland) n265 p3-50 1963, tr. by R. Dzieciolowski.

Descriptors: (*Trees, Insects), Growth, Damage, Atmospheric precipitation, Snow, Wind, Volume, Barometric pressure, Classification, Distribution, Ecology, Poland.

The object of the study is the most exhaustive review possible of insects feeding on the Polish larch, Larix polonica Rac. The idea was prompted by both the lack of such a monograph and by the practical needs of economy. Insects attacking the European larch, Larix decidua Mill., have been in general rather well investigated mainly by foreign researchers, but no investigations whatsoever have been conducted over Polynos native Larix polonica. (Author)
TT-66-57021 HC$3.00

AN EXPERIMENT ON INHIBITING SCHIZOPHYLLUM COMMUNE Fr. DEVELOPMENT BY ANTAGONISM,
National Science Foundation, Washington, D. C.Special Foreign Currency Science Information Program.
For primary bibliographic entry see Field 6M.
TT-67-58010 HC$3.00 MF$0.65

OBSERVATIONS ON SARDINE BEHAVIOR UNDER ARTIFICIAL LIGHT,
National Science Foundation, Washington, D. C. Special Foreign Currency Science Information Program.
Fabjan Grubisic. 1967, 17p SFCSI-Int (TT-67-58026)
Trans. of mono. Opazanja o Ponasanju Srdele pod Umjetnim Svjetlom, Belgrade, 1962 p3-15, tr. by Karmela Vlahovic.

Descriptors: (*Fishes, Behavior), Photosensitivity (Biological), Swimming, Cephalopoda, Periodic variations, Yugoslavia.
Identifiers: Sardines.
TT-67-58026 HC$3.00 MF$0.65

FAUNA OF THE U.S.S.R. DIPTERA, VOL. 3, NO. 2. PHLEBOTOMIDAE (SANDFLIES),
National Science Foundation, Washington, D. C. Special Foreign Currency Science Information Program.
P. P. Perfilev. 1968, 374p SFCSI-Smi (TT-68-50341).
Trans. of Fauna S.S.S.R. Novaya Seriya, n93 383p 1966, tr. by Jean Salkind.

Descriptors: (*Diptera, USSR), Morphology (Biology), Anatomy, Larvae, Identification, Distribution, Life cycle, Ecology, Bites + stings, Disease vectors, Leishmania, Pest control, Collecting methods, Classification, Catalogs.
Identifiers: Phlebotomidae, Taxonomy.

Contents: Survey of the study of the systematics of sandflies; Morphological-anatomical survey; Survey of systematic characters; Geographical distribution; Biology; Medical importance; Control of sandflies; Methods of study; Systematic catalog.
TT-68-50341 HC$3.00 MF$0.65

6D. Bionics

LANGUAGES, AUTOMATA AND CLASSES OF CHAIN-ENCODED PATTERNS.
New York Univ N Y Lab for Electroscience Research
For primary bibliographic entry see Field 5G.
AD-668 081 HC$3.00 MF$0.65

A RENEWAL THEORETIC APPROACH TO A FIRST PASSAGE TIME PROBLEM OCCURRING IN A NEURON FIRING MODEL.
Technical rept.,
Johns Hopkins Univ Baltimore Md Dept of Statistics
Joseph L. Gastwirth. Oct 67, 14p Rept no. TR-77
Grant NSF-GP-7118

Descriptors: (*Nerve impulses, Mathematical models), Nerve cells, Probability, Distribution functions, Random variables, Integral transforms, Exponential functions, Statistical processes.

The note presents an alternative approach to the mathematical analysis of a neuron firing model proposed by Ten Hoopen. It is concluded that the times between neuron firings will not be a Poisson process if Ten Hoopen's model represents the true firing process and the level of depolarization required for the neuron to fire is not too large. Therefore, the possible validity of these models is subjected to experimental verification. (Author)
AD-668 149 HC$3.00 MF$0.65

BIOLOGICAL PRINCIPLES OF INFORMATION STORAGE AND RETRIEVAL,
Illinois Univ Urbana Biological Computer Lab
For primary bibliographic entry see Field 5B.
AD-668 284 Not available from CFSTI.

QUARTERLY TECHNICAL PROGRESS REPORT OCTOBER, NOVEMBER, DECEMBER 1967.
Illinois Univ Urbana Dept of Computer Science
For primary bibliographic entry see Field 9B.
AD-668 321 HC$3.00 MF$0.65

MATHEMATICAL APPARATUS OF BIOLOGICAL CYBERNETICS,
Foreign Technology Div Wright-Patterson AFB Ohio
V. I. Chernysh, and A. V. Napalkov. 19 Jun 67, 326p Rept no. FTD-MT-65-163
Edited machine trans. of mono. Matematicheskii Apparat Biologicheskoi Kibernetiki, Moscow, 1964 p1-374.

Descriptors: (*Cybernetics, Mathematical analysis), Set theory, Functional analysis, Probability, Statistical analysis, Algorithms, Information theory, Mathematical logic, Game theory, Control systems, Biochemistry, USSR.
Identifiers: Translations, Biocybernetics, Turing machines.

The book is intended for physicians, physiologists, and biologists concerned with the application of cybernetic methods to medical and biological research and for students in advanced courses in medical and biological departments of schools of higher education. The mathematical methods of general cybernetics and additional information required for work in the field of biological cybernetics are presented. The problems of specific mathematical research of various biological control systems and of the processes occurring in these systems are discussed. The significance of the application of mathematical cybernetics for the solution of various medical and physiological problems is analyzed. Basic information is given on the theory of sets, functions, the theory, and the game theory, as well as the design and operation of control systems. (Author)
AD-668 374 HC$3.00 MF$0.65

IMPORTANCE OF USING CYBERNETICS IN MEDICINE DISCUSSED,
Joint Publications Research Service, Washington, D. C.
V. Tikhomirov. 30 Jan 68, 8p
Trans. from Ekonomicheskaya Gazeta (USSR) n47 p34 1967.

Descriptors: (*Medical research, *Cybernetics), USSR.
JPRS-44194 HC$3.00 MF$0.65

SOVIET SCIENTISTS PREDICT FUTURE OF CYBERNETICS AND MEDICINE,
Joint Publications Research Service, Washington, D. C.
V. Glushkov, and Nikolai Mikhailovich Amosov. 1 Feb 68, 9p
Trans. from Pravda, Moscow (USSR) 31 Dec p6 1967 and Izvestiya (USSR) 1 Jan p3 1968.

Descriptors: (*Medical research, *Cybernetics), Predictions, USSR.

Contents: Academician V. Glushkov comments on future of cybernetics; Soviet physician comments on future of medicine.
JPRS-44222 HC$3.00 MF$0.65

6E. Clinical Medicine

QUARTERLY PROGRESS REPORT FOR JANUARY-FEBRUARY-MARCH 1968.
Walter Reed Army Medical Center Washington D C Army Medical Biomechanical Research Lab Mar 68, 21p
See also AD-660 290.

Descriptors: (*Prosthetics, Medical research), Tissues (Biology), Adhesives, Acrylic resins, Polymers, Muscles, Stimulation, Extremities, Supports, Exercise, Hands, Joints (Physiology), Hooks, Medical supplies, Electromyography, Rehabilitation, Amputees.
Identifiers: Polycyanoacrylates.

Research and development items include: Tissue adhesives; Antithrombic polymers; Biodegradable polymers; Bioelectric myostimulation; Lower extremity bracing; Exercise-traction unit; Externally powered prostheses--electric elbow, electric hand, electric hook, voluntary opening-center control hook, optical inserts, transparent sockets, burn splint--hand, inflatable splint--neck; Burn bed; EMG monitor; Pronation-supination sandblock. Rehabilitation loom; Silicone foam properties; Yugoslavian hand evaluation.
AD-667 944 HC$3.00 MF$0.65

ENDOGENOUS MECHANISM OF VASCULAR RESPONSE IN INFLAMMATION, WITH SPECIAL REFERENCE TO BIOLOGIC SIGNIFICANCE OF SPECIFIC PERMEABILITY FACTORS AND THEIR INHIBITORS NEWLY ISOLATED FROM INFLAMED SITES.
Kumamoto Univ (Japan) Medical School
For primary bibliographic entry see Field 6A.
AD-667 993 HC$3.00 MF$0.65

BIOLOGIC REACTIONS OF CELLULAR ANTIBODIES WITH SPECIAL REFERENCE TO THEIR IMMUNO-PATHOLOGICAL AND IMMUNO-CHEMICAL PROPERTIES.
Kumamoto Univ (Japan) Medical School
For primary bibliographic entry see Field 6M.
AD-667 994 HC$3.00 MF$0.65

DAY-TO-DAY CHANGES IN CORONARY HEMODYNAMICS SECONDARY TO CONSTRICTION OF CIRCUMFLEX BRANCH OF LEFT CORONARY ARTERY IN CONSCIOUS DOGS,
Walter Reed Army Inst of Research Washington D C
Eric C. Elliot, Ellis L. Jones, Colin M. Bloor, Arthur S. Leon, and Donald E. Gregg. 1968, 14p
Prepared for presentation at the Scientific Session of the American Heart Association (39th) New York, New York, October 21-23, 1966.
Availability: Published in Circulation Research, v22 p237-50 Feb 1968.

Descriptors: (*Cardiovascular system, Obstruction (Physiology)), Arteries, Heart, Blood circulation, Cardiovascular diseases, Blood pressure, Mortality rates, Pathology.

The studies were carried out in four dogs. The effects of applying ameroid constrictors to the circumflex branch were observed on the circumflex blood flow, circumflex and peripheral circumflex pressures, circumflex reactive hyperemia and aortic-circumflex pressure difference. Recordings were successfully made for periods of 16 to 64 days. During this time the circumflex branch became completely occluded in three of the dogs. The circumflex blood flow remained in the normal range until reactive hyperemia (following a 10- to 12-second occlusion of the circumflex branch) almost disappeared; the flow then decreased to zero in 5 to 10 days. Although there was some rise in mean peripheral circumflex pressure and aortic-circumflex pressure difference before circumflex blood flow decreased, the major rise in these variables occurred only when flow and reactive hyperemia became markedly decreased. The maximum rate of rise of mean peripheral circumflex pressure varied from 6 to 15 mm Hg/24 hours. The experiments indicate that a severe degree of coronary insufficiency precedes a rise in mean peripheral circumflex pressure to 60 to 70 mm Hg. We interpret such increments in mean peripheral circumflex pressure to mean that large collaterals must be open; the studies with injection of Schlesinger mass confirmed this interpretation. (Author)
AD-668 133 Not available from CFSTI.

CYTOGENETIC CHANGES IN CHRONIC GRANULOCYTIC LEUKEMIA DURING BLAST CRISIS: TWO PH1 CHROMOSOMES AND HYPERDIPLOIDY,
Walter Reed Army Inst of Research Washington D C
William H. Knospe, Richard W. Klatt, James W. Bergin, Cecil B. Jacobson, and Marcell E. Conrad. 1967, 8p
Availability: Published in The American Journal of the Medical Sciences, v254 n6 p816-23 Dec 1967.

Descriptors: (*Chromosomes, *Leukemia), Leukocytes, Cytology, Tissue culture, Bone marrow, Mitosis, Anomalies, Etiology.
Identifiers: Blast cells.

Cytogenetic studies during the acute blastic crisis of chronic granulocytic leukemia showed that certain patients retain a single Ph1 chromosome while others developed cellular lines with double Ph1 chromosomes. Marked aneuploidy occurred in the latter group of patients and was associated with a blastic infiltration of lymph nodes, skin, muscle and bone that was difficult to distinguish from reticulum cell sarcoma in tissue sections. The association of cytogenetic and clinical findings may indicate an etiologic relationship. (Author)
AD-668 189 Not available from CFSTI.

USE OF TISSUE ADHESIVES FOR ARTERIAL ANASTOMOSES,
Walter Reed Army Inst of Research Washington D C
Teruo Matsumoto, and Harold F. Hamit. 6 Sep 67, 5p
Availability: Published in Archives of Surgery, v96 p405-9 Mar 1968.

Descriptors: (*Surgical techniques, Arteries), (*Tissues (Biology), Adhesives), Acrylic resins, Aerosols, Sprays, Surgical supplies, Hemorrhage, Blood coagulation.
Identifiers: Polycyanoacrylates.

In a 14-month follow-up study, invagination adhesive method of arterial anastomosis, compared to conventional suturing, was more rapid but resulted in decreased patency rate of the anastomoses. At present, the best use of n-butyl cyanoacrylate monomer in arterial anastomosis is for reinforcement

of bleeding suture lines. Until further experimental studies and observation are completed, the use of aerosol tissue adhesive should be restricted to an emergency situation in which life or limb are endangered and which cannot be controlled by conventional methods. (Author)
AD-668 190 Not available from CFSTI.

VASCULAR ALTERATIONS IN EXPERIMENTAL HYPERTENSION,
Pennsylvania Univ Philadelphia Bockus Research Inst
A. W. Jones, L. H. Peterson, and E. O. Feigel. 1967, 7p
Grant PHS-HE-07762
Research supported in part by NONR.
Availability: Published in Baroreceptors and Hypertension, Proceedings of an International Symposium, Dayton, Ohio, Nov 16-17, 1965 p309-15.

Descriptors: (*Hypertension, *Arteries), Electrolytes (Physiology), Mechanical properties, Metabolism, Muscles, Osmosis, Water, In vitro analysis, Pathology.
Identifiers: *Baroreceptors.

The in vitro studies underscore the great flexibility exhibited by normal vascular smooth muscle to alterations in its environment. It is therefore possible to conceive of the water and electrolyte changes which take place in the abnormal state as reflecting altered smooth muscle function without having to postulate changes in cell protein and connective tissue composition within the arterial wall. The normal control of cellular processes, however, depends upon the complex interactions of internally produced bioregulants such as catecholamines, angiotensin, and aldosterone as well as the electrolyte composition of the surrounding fluid. Understanding of the mechanisms operating in the vascular alterations associated with hypertension will not come until such interactions have been fully characterized. (Author)
AD-668 196 Not available from CFSTI.

A VASCULAR-PERMEABILITY-INCREASING FACTOR IN THE SERUM OF MONKEYS INFECTED WITH PRIMATE MALARIAS,
SEATO Medical Research Lab Bangkok (Thailand)
R. S. Desowitz, and Katchrinnee Pavanand. 1967, 7p
Availability: Published in Annals of Tropical Medicine and Parasitology, v61 n2 p128-33 Jun 1967.

Descriptors: (*Parasitic diseases, Pathology), (*Plasmodium, Parasitic diseases), Immunology, Antigen-antibody reactions, Blood vessels, Permeability, Blood serum, Globulins, Antihistaminics, Thailand.
Identifiers: Promethazine.

The sera of monkeys infected with Plasmodium inui or P. coatneyi caused an increased vascular permeability when inoculated into the skin of rabbits. Vascular-permeability-increasing factor (PIF) activity in P. inui-infected sera was reduced during the chronic stage of the infection but reappeared during recrudescences. In acute infections a decrease in activity was observed immediately before or during the height of the primary parasitaemia. The activity of infected sera was blocked when an antihistamine, promethazine, was given to the rabbits. (Author)
AD-668 200 Not available from CFSTI.

EVALUATION OF STANDARD ECG LEADS FOR MASS SCANNING,
Naval Hospital Philadelphia Pa
Paul J. Schneider, and Alexander A. Birch, Jr. Apr 68, 2p
Availability: Published in Journal of the American Medical Association, v204 p149-50 Apr 1968.

Descriptors: (*Electrocardiography, *Public health), Accuracy, Medical examination, Cardiovascular diseases, Diagnosis, Computers, Statistical analysis.

The accuracy in analysis of the six standard electrocardiographic leads for mass screening was evaluated from 2,000 randomly selected tracings. The ECGs were interpreted as normal or abnormal by generally accepted criteria without benefit of clinical history. Comparison with the full 12-lead ECG was made. Twelve hundred and sixteen (60.8%) were normal and 730 (36.5%) were abnormal. Twenty-six (3.44%) false-negative and 28 (2.25%) false-positive results occurred. The sensitivity and specificity of the method were 96.56% and 97.75%, respectively. The use of the standard ECG leads for mass screening is feasible for the following reasons: (1) It is a rapid technique necessitating no change in pattern or vector approaches to interpretation. (2) The patient need not be recumbent or undressed. (3) The accuracy compares favorably with that of 12-lead analysis. (4) The method is readily adaptable to computer interpretation. (Author)
AD-668 201 Not available from CFSTI.

A SEROLOGIC SURVEY FOR ARBOVIRUS ANTIBODIES IN INHABITANTS OF A SOUTHWEST TAIWAN VILLAGE.
Technical rept.,
Naval Medical Research Unit No 2 Taipei (Taiwan)
E. J. Clarke, Jr., E. C. Suitor, Jr., and H. M. Jenkin. 1967, 11p Rept no. NAMRU-2-TR-301
Availability: Published in Tropical and Geographical Medicine, v19 326-32 1967.

Descriptors: (*Serodiagnosis, Arboviruses), (*Arboviruses, Antigens + antibodies), Japanese B encephalitis virus, Dengue, Chikungunya virus, Infectious diseases, Epidemiology, Taiwan.
Identifiers: Hemorrhagic fever.

A serologic survey for arbovirus antibodies was made in a relatively isolated population of southwest Taiwan, an area of previous dengue fever outbreaks. Antibody to Japanese encephalitis virus was widely distributed among all age groups. Dengue antibody was present in age groups over 20, confirming published reports that epidemic disease had occurred last in the early 1940's. Although chikungunya virus antibody was present in almost all study groups, it was significantly higher in the group over 40 years of age. A population susceptible to viruses producing hemorrhagic disease syndromes has been delineated. (Author)
AD-668 204 Not available from CFSTI.

1967 RESEARCH CLERKSHIP REPORTS.
Final rept.,
Naval Medical Research Unit No 4 Great Lakes Ill
Bennie B. Gilmore, William P. Hunt, Thomas A. McKenzie, III, John R. Page, and Robert O. Pohl. Mar 68, 71p Rept no. NAMRU-4-68.2

Descriptors: (*Medical research, Reports), Antibiotics, Neisseria meningitidis, Antigen-antibody reactions, Variola virus, Vaccines, Immunity, Lymphocytes, Allergy, In vitro analysis, Medical equipment, Chemotherapeutic agents, Mycoplasma, Infectious diseases, Naval research.
Identifiers: Erythromycin, L-form bacteria, Antitumor agents.

Contents: Erythromycin prophylaxis for elimination of meningococci from healthy carriers; Physiochemical characteristic of complement-fixing antigens to the L-forms and parent strains of Neisseria meningitidis; Production of complement-fixing antigens from the L-forms of Neisseria meningitidis; Use of the pneumatic jet gun for smallpox vaccination of naval recruits; Lymphocyte transformation as an in vitro method of showing hypersensitivity; In vitro effects of antibiotic, chemotherapeutic, and antitumor agents on mycoplasma species of human origin.
AD-668 219 HC$3.00 MF$0.65

CONNECTIVE TISSUE COMPOSITION OF CANINE ARTERIES. EFFECTS OF RENAL HYPERTENSION,
Pennsylvania Univ Philadelphia Bockus Research Inst
Grace M. Fischer, and Josep G. Llaurado. Jul 67, 4p
Contract Nonr-551 (54), Grant PHS-HE-07762
Availability: Published in Archives Pathology, v84 p95-8 Jul 67.

Descriptors: (*Hypertension, *Arteries), Elasticity, Connective tissue, Collagen, Muscles, Kidneys, Diseases, Pathology.

The contents of collagen and elastin in arterial wall of dogs with induced renal hypertension were determined biochemically in 13 different sites of the arterial tree. Values of total connective tissue and of collagen to elastin ratio (C/E), which is used as an index of passive distensibility, for corresponding arterial sites were generally lower in hypertensive as compared with normal dogs. In no site of those studied was the C/E significantly higher in the hypertensive group. Although arteries become stiffer in both renal hypertension and the process of aging, present results indicate that the stiffening of arteries in the course of renal hypertension is not an accelerated aging change of the type evidenced by increased collagen and decreased elastin contents. By implication, the role of other factors in elastic changes of the arterial wall in hypertension is emphasized. (Author)
AD-668 279 Not available from CFSTI.

THE BIOCHEMISTRY OF THE ACUTE ALLERGIC REACTIONS,
Council for International Organizations of Medical Sciences Paris (France)
Elmer L. Becker, and K. Frank Austen. Jun 67, 8p
Summary of the Symposium Organized by CIOMS.
Availability: Published in Immunopathology, International Symposium on Mechanisms of Inflammation Induced by Immune Reactions (5th), Punta Ala, Italy, Jun 67 p419-24.

Descriptors: (*Allergy, Biochemistry), Immunology, Antigen-antibody reactions, Gamma globulin, Pollen, Leukocytes, Histamine, Secretion, Enzymes, Immunity, Responses, Anaphylaxis, Immune serums, Reviews, Symposia, France.
Identifiers: Inflammation (Pathology).

The symposium on the biochemistry of acute allergic reactions was held at Punta Ala, Italy, June 5-7, 1967. Summaries are given of 18 reports presented at the conference.
AD-668 295 Not available from CFSTI.

ENZYMATIC MECHANISMS CONCERNED IN THE COMPLEMENT INDUCED CHEMOTAXIS OF RABBIT POLYMORPHONUCLEAR LEUKOCYTES,
Walter Reed Army Inst of Research Washington D C
For primary bibliographic entry see Field 6A.
AD-668 296 Not available from CFSTI.

GROUP-SPECIFIC HEMAGGLUTINATION TEST FOR NEISSERIA MENINGITIDIS ANTIBODIES,
Naval Medical Research Unit No 4 Great Lakes Ill
E. A. Edwards, and W. S. Driscoll. Dec 67, 7p
Rept no. NAMRU-4-67.12
Availability: Published in Proceedings of the Society for Experimental Biology and Medicine, v126 p876-9 1967.

Descriptors: (*Serodiagnosis, *Neisseria meningitidis), Antigen-antibody reactions, Identification, Infectious diseases.

An antigen from Neisseria meningitidis, which sensitized sheep erythrocytes causing them to hemagglutinate in the presence of antisera, is described. The antigen proved to be group-specific

and thus provides a serological test capable of identifying meningococcal organisms associated with N. meningitidis infections or disease. In studying the meningococcus acquisition rate in a company of Naval recruits, seroresponse and bacterial isolations agreed at a highly significant level. (Author)
AD-668 316 Not available from CFSTI.

A DIRECTORY OF RESEARCH IN PSYCHOLOGY, PSYCHIATRY, NEUROLOGY, AND SOCIOLOGY SUPPORTED BY THE MEDICAL RESEARCH COUNCIL, UNITED KINGDOM,
Office of Naval Research London (England)
Newell H. Berry. Mar 68, 51p Rept no. ORNL-D-14

Descriptors: (*Medical research, Directories), Psychology, Psychiatry, Sociology, Neurology, Scientific research, Research program administration, Scientific personnel, Great Britain.

Information in this directory was abstracted from the Annual Report (April 1965-March 1966) of the Medical Research Council (MRC) of the United Kingdom, which was printed in August of 1966. The complete report (of 377 pages) can be obtained from The British Information Service, 845 Third Avenue, New York, 10022, at a cost of approximately $3.00, postage extra. It is an excellent source of information about research work in medicine and related fields in the UK, and would be very useful in the library of any academic department or research institution in those fields. An attempt was made to extract from the report all research which would appear to be of interest to workers in psychology, psychiatry, sociology, and neurology. (Author)
AD-668 346 HC$3.00 MF$0.65

ANTIBODY CONCENTRATION AND TEMPERATURE AS DETERMINANTS OF IN VITRO SENSITIZATION AND HISTAMINE RELEASE IN ISOLATED CARDIAC TISSUES,
Stanford Univ Calif Dept of Physiology
For primary bibliographic entry see Field 6P.
AD-668 429 Not available from CFSTI.

THE SPECIFIC INHIBITION OF IN VITRO ANAPHYLAXIS AND HISTAMINE RELEASE BY DIALYZABLE MATERIAL FROM RAGWEED POLLEN,
Stanford Univ Calif Dept of Physiology
For primary bibliographic entry see Field 6P.
AD-668 430 Not available from CFSTI.

THE STATUS AND FUTURE DEVELOPMENT OF EXPERIMENTAL SURGERY IN BULGARIA,
Joint Publications Research Service, Washington, D. C.
G. Krustinov, and D. Marinov. 10 Jan 68, 7p
Trans. of Khirurgiya (USSR) n5 p409-13 Oct-Nov 67.

Descriptors: (*Surgery, *Medical research), Scientific organizations, Medical personnel, Training, Bulgaria, USSR.
JPRS-43952 HC$3.00 MF$0.65

STUDIES RELATING TO VIRUS CONTROL,
Joint Publications Research Service, Washington, D. C.
O. V. Baroyan, E. N. Levkovich, and A. G. Moroz. 11 Jan 68, 30p
Trans. of Voprosy Virusologii (USSR) n5 p515-30, 562-6 Sep 67.

Descriptors: (*Virus diseases, Control), Etiology, Disease vectors, Radiation effects, Public health, Variola virus, Rabies virus, Chlamydia trachomatis, Japanese B encephalitis virus, Poliomyelitis virus, Influenza virus, Mumps virus, Measles viruses, Immunity, Vaccines, USSR.

Contents: Fifty years' effort to control virus infections in the USSR; Thirtieth anniversary of the discovery of the causative agent of tick-borne encephalitis; Relationship between the effect of ionizing radiation on the course of virus infections and the virus dose used to inoculate animals.
JPRS-43974 HC$3.00 MF$0.65

SOVIET PROGRESS IN THE CONTROL OF MALARIA AND OTHER PARASITIC DISEASES,
Joint Publications Research Service, Washington, D. C.
P. G. Sergiev, M. G. Rashina, S. Ya. Sarikyan, N. K. Shipitsina, and N. I. Polevoi. 11 Jan 68, 32p
Trans. of Meditsinskaya Parazitologiya i Parazitarnye Bolezni (USSR) n5 p515-32, 618-9 1967.

Descriptors: (*Parasitic diseases, Control), Plasmodium, Diseases, Disease vectors, Public health, Entomology, USSR.

Contents: Fifty years' control of parasitic diseases in the USSR -- the role of Party, Soviet, and public organizations; Stages in the control and eradication of malaria in the USSR; Main results of the study of malaria vectors and development of control measures in the Soviet Union during the past 50 years; Progress in the campaign to eradicate malaria in the Democratic Republic of Vietnam.
JPRS-43976 HC$3.00 MF$0.65

HISTORY OF THE MAIN MILITARY HOSPITAL,
Joint Publications Research Service, Washington, D. C.
P. Ponamerev. 17 Jan 68, 8p
Trans. of Tyl i Snabzhenie Sovetskikh Vooruzhennykh Sil (USSR) n11 p56-9 1967.

Descriptors: (*Military medicine, USSR), History, Growth, Hospitals, Personnel.

On 4 October 1967 the Main Military Hospital imeni Academician N. N. Burdenko will be 260 years old. The establishment and development of medical and hospitalization service in our country is connected with this medical establishment. The Moscow hospital went into operation in 1707. Soon after that the first medical school in Russia was organized there, which initiated regular medical training and was a sample for the creation of similar hospitals schools in the future. Graduates of these schools played a big role in the development of the domestic public health system, as well as clinical and military medicine. (Author)
JPRS-44047 HC$3.00 MF$0.65

TRANSMISSION OF THE TULAREMIA PATHOGEN TO HOMOTHERMAL ANIMALS BY IXODES TICKS,
Joint Publications Research Service, Washington, D. C.
For primary bibliographic entry see Field 6C.
JPRS-44105 HC$3.00 MF$0.65

FIFTY YEARS' PROGRESS IN VARIOUS FIELDS OF SOVIET MEDICINE,
Joint Publications Research Service, Washington, D. C.
P. D. Gorizontov, V. A. Negovskii, and A. M. Gurvich. 24 Jan 68, 41p
Trans. of Patologicheskaya Fiziologiya i Eksperimentalnaya Terapiya (USSR) n5 p3-9, 32-48 1967.

Descriptors: (*Medicine, USSR), Pathology, Radiation sickness, Therapy, Medical personnel, Regeneration.

Contents: Fifty years of Soviet pathological physiology; Pathogenesis and experimental therapy of radiation sickness in the works of Soviet pathophysiologists during the past fifty years; Progress of reanimatology in the USSR.
JPRS-44135 HC$3.00 MF$0.65

PRELIMINARY RESULTS IN A STUDY OF NATURAL FOCI OF TULAREMIA IN THE SISAK-GUSCE-POPAVACA REGION OF CROATIA.
Joint Publications Research Service, Washington, D. C.
26 Jan 68, 13p
Trans. of Lijecnicki Vjesnik (Yugoslavia) n8 p591-600 1967.

Descriptors: (*Pasteurella tularensis, *Epidemiology), Diseases, Public health, Ecology, Disease vectors, Distribution, Rodents, Yugoslavia.

A multidiscipline study of a natural focus of tularemia in the Sisak-Gusce-Popovaca area revealed that 15 humans were infected in the 1964/1965 epidemic, and not nine as indicated by the record. The number of tularin reactors was 27 out of 623 persons tested (4.3%), and on this basis it is assumed that about 4% of the population of that area was infected with tularemia in the last epidemic of previous epidemics. The dominant species of wild rodents in the period one year after an epizootic of tularemia in the focus were Apodemus agrarius and Apodemus sylvaticus (the field mouse and the wood mouse). On the basis of pathomorphological signs in captured animals and white mice inoculated with a suspension of their organs, about 20% of autochthonous wild animals in the focus could have been infected with tularemia in the period in question. The reservoir of the infection was the genus Apodemus; Francisella tularensis was isolated bacteriologically from three specimens of Apodemus agrarius and Leptospira icterohaemorrhagiae was isolated from one specimen of Apodemus agrarius in the area of the village of Preloscica, in addition to six strains of Leptospira sejroe, isolated from all over the natural focus from all three species of Apodemus captured (agrarius, sylvaticus and flavicollis). The significance of tularemia for the region studied is greater from the health standpoint than might be concluded on the basis of the small number of recorded cases. (Author)
JPRS-44159 HC$3.00 MF$0.65

FIFTY YEARS PROGRESS IN SOVIET INTERNAL MEDICINE AND HEMATOLOGY,
Joint Publications Research Service, Washington, D. C.
A. G. Gukasyan, I. A. Kassirskii, E. I. Atakhanov, and A. Ya. Gubergrits. 1 Feb 68, 36p
Trans. of Terapevticheskii Arkhiv (USSR) n11 p3-10, 15-21, 29-39 1967.

Descriptors: (*Medicine, USSR), Hematology, Gastrointestinal system, Medical research, Public health, Diagnosis, Therapy.

Contents: Therapy in the service of Soviet health; Fifty years of Soviet hematology; Fifty years of internal medicine in Uzbekistan; Fifty years of Soviet clinical gastroenterology.
JPRS-44223 HC$3.00 MF$0.65

BOTULISM CONTROL MEASURES IN THE SOVIET UNION,
Joint Publications Research Service, Washington, D. C.
T. I. Bulatova. 9 Feb 68, 25p
Trans. of mono. Botulizm i Ego Profilaktika, Moscow, 1966 p3-5, 22-40.

Descriptors: (*Clostridium botulinum, Control), Epidemiology, Sanitary engineering, Etiology, Spores, Toxicity, Distribution, Ecology, Food poisoning, Public health, USSR.

Contents: Epidemiology of botulism; The clinical picture of botulism; The prophylaxis of botulism; Sanitary-prophylactic measures against botulism.
JPRS-44310 HC$3.00 MF$0.65

ANTIGENIC AND IMMUNOGENIC PROPERTIES OF STAPHYLOCOCCAL DELTA-TOXIN,
Joint Publications Research Service, Washington, D. C.
For primary bibliographic entry see Field 6M.
JPRS-44341 HC$3.00 MF$0.65

EFFECT OF TRANSPLANTATION OF FRESH HOMOLOGOUS BONE MARROW ON THE

COURSE OF HYPOPLASTIC AND APLASTIC ANEMIAS,
Joint Publications Research Service, Washington, D. C.
F. E. Fainshtein. 20 Feb 68, 10p
Trans. of Problemy Gematologii i Perelivaniya Krovi (USSR) n12 p3-8 1967.

Descriptors: (*Bone marrow, *Transplantation), Anemias, Therapy, Hematology, Hemorrhage, Allergy, Immunity, Leukocytes, Hemopoietic system, USSR.

Analysis of the data reveals the desirability of using fresh donor bone marrow in hypo- and aplastic anemias. It has a beneficial effect in a number of patients. Myelotherapy does not, however, rule out other procedures, splenectomy in particular. On the contrary, observations over many years by members of surgical, hematological, and radiological departments show that transplantation combined with splenectomy has a marked therapeutic effect. (Author)
JPRS-44434 HC$3.00 MF$0.65

FORENSIC MEDICINE AND MATERIAL EVIDENCE IN THE USSR,
Joint Publications Research Office, Washington, D. C.
M. A. Bronnikova, and A. S. Garkavi. 20 Feb 68, 9p
Trans. of Sudebno-Meditsinskaya Ekspertiza (USSR) n4 p3-7 1967.

Descriptors: (*Medical examination, *Criminology), Law, Medical personnel, Blood analysis, Blood groups, Body fluids, Identification, Antigens + antibodies, Hair, USSR.
JPRS-44435 HC$3.00 MF$0.65

IS THERE A REVOLUTION IN MEDICAL SERVICE TO THE POPULATION OF THE UNITED STATES,
Joint Publications Research Service, Washington, D. C.
S. Ya. Chikin. 23 Feb 68, 7p
Trans. of Kazanskii Meditsinskii Zhurnal (USSR) n6 p78-81 1967.

Descriptors: (*Medicine, United States), Public health, Epidemiology, Hospitals, Diseases, USSR.
JPRS-44471 HC$3.00 MF$0.65

FIFTY YEARS OF SOVIET STOMATOLOGY,
Joint Publications Research Service, Washington, D. C.
A. I. Evdokimov, A. G. Safonov, A. I. Rybakov, I. A. Fokin, and V. V. Panikarovskii. 28 Feb 68, 27p
Trans. of Stomatologiya (USSR) n5 p6-19, 43-6 Sept/Oct 1967.

Descriptors: (*Dentistry, USSR), Public health, History, Teeth, Tissues (Biology), Mouth, Lasers, Dental personnel, Diseases, Therapy.

Contents: History of Soviet stomatology (1917-1967); Achievements and prospects of Soviet stomatology; The effect of laser radiation on the teeth and soft tissues of the oral cavity.
JPRS-44519 HC$3.00 MF$0.65

HYGIENE AND SANITATION RESEARCH IN USSR.
Joint Publications Research Service, Washington, D. C.
For primary bibliographic entry see Field 6I.
JPRS-44563 HC$3.00 MF$0.65

6F. Environmental Biology

CBE FACTORS MONTHLY SURVEY NO. 24.
Library of Congress Washington D C Aerospace Technology Div
For primary bibliographic entry see Field 15B.
AD-668 075 HC$3.00 MF$0.65

SOVIET PROGRESS IN THE CONTROL OF MALARIA AND OTHER PARASITIC DISEASES,
Joint Publications Research Service, Washington, D. C.
For primary bibliographic entry see Field 6E.
JPRS-43976 HC$3.00 MF$0.65

ADAPTATION OF RHIZOCTONIA SOLANI KUEHN TO FUNGICIDES,
Joint Publications Research Service, Washington, D. C.
For primary bibliographic entry see Field 6M.
JPRS-44565 HC$3.00 MF$0.65

6H. Food

DEVELOPMENT OF ICE CREAM PLANT, CONTINUOUS FLOW, PORTABLE.
Technical rept.,
Army Natick Labs Mass General Equipment and Packaging Lab
Bruce B. Thomas. Mar 68, 15p
USA-NLABS-TR-68-36-GP

Descriptors: (*Frozen foods, Industrial plants), (*Industrial plants, Mobile), Kitchen equipment + supplies, Military rations, Military requirements, Freezing, Refrigeration systems, Storage tanks, Production, Feasibility studies, Fluid flow.
Identifiers: *Ice cream.

Development of a continuous flow, portable, ice cream plant was undertaken to meet requirements for a unit with a minimum output of 50 gallons of ice cream per hour that could be transportable by a 2-1/2-ton vehicle. The main components of the plant were to be a continuous flow freezer, refrigeration system, mix tank, pump, and mounting base. These individual components were available commercially, but a complete, portable plant had never been built with its own refrigeration system. After initial design of the units, two plants were built by commercial sources and tested by the manufacturers. Further evaluation was conducted at the U. S. Army Natick Laboratories. Results of tests indicated satisfactory operation of the experimental prototypes, and that the design concepts and available hardware were acceptable. (Author)
AD-667 930 HC$3.00 MF$0.65

DEVELOPMENT OF A METHOD TO QUANTITATE FOOD-BORNE VIRAL INFECTIVITY.
Final rept. 1 Aug 66-30 Jun 67,
Wisconsin Univ Madison Food Research Inst
Dean O. Cliver. Feb 68, 24p
SAM-TR-68-17
Contract AF 41 (609)-2982

Descriptors: (*Food, Biological contamination), Viruses, Detection, Quantitative analysis, Tissue culture, Virus diseases, Sampling, Costs.

Methods developed for detection and quantitation of food-borne virus are described. Twenty-five-gm. samples of cottage cheese, contaminated with various quantities of Coxsackie virus, type A9, comprised the model system. Two of the methods presented have at least a 50% probability of detecting virus at levels below 5 plague-forming units/25-gm. sample. Noteworthy aspects of these methods include use of a glycine-NaOH buffer (pH 8.8) containing approximately molar $MgCl_2$ as the diluent in which the sample is slurried, treatment of the slurry with Freon TF and bentonite to facilitate centrifuge clarification, and concentration of the clarified sample extract by a 2-stage process employing polyethylene glycol followed by ultracentrifugation. Virus in the final concentrate (0.5 ml.) of the sample has been detected and quantitated by the plague technic in rhesus monkey kidney cell cultures. Time elapsed in processing the sample approaches 2 days, and the inoculated cultures may have to be observed for as long as 7 days thereafter. If these levels of sensitivity are desired, and if 12 samples per day are tested on a routine basis, the cost savings achieved by employing these methods rather than testing sample extracts without concentration may range from 75% to 90%. (Author)
AD-668 453 HC$3.00 MF$0.65

PLANT REQUIREMENTS TO SET UP AND OPERATE A MEAT PROCESSING PLANT.
Revised ed.
International Cooperation Administration, Washington, D. C. Technical Aids Branch.
May 59, 54p
Prepared in cooperation with Andrews (George H.) Engineering Associates, Inc., Washington, D. C.

Descriptors: (*Meat, Processing), Industrial plants, Industrial equipment, Personnel, Production control, Labor, Costs.

The purpose of this manual is to provide information about the establishment and operation of a small meat processing plant. The manual provides a description of the slaughtering and of the processing of meat products as these activities might be carried out in a small plant in United tates. It includes a description of the plant layout, equipment and personnel and estimates of investment, operating costs and revenues. Local situations might make some changes desirable but the plant described is satisfactory for a considerable variation in materials and methods of processing and product without serious modification of the design and operation. (Author)
PB-177 926 HC$3.00 MF$0.65

PLANT REQUIREMENTS FOR MANUFACTURE OF SOYBEAN OIL AND MEAL.
International Cooperation Administration, Washington, D. C. Technical Aids Branch.
For primary bibliographic entry see Field 13H.
PB-177 933 HC$3.00 MF$0.65

MAYONNAISE.
Technical inquiry service.
International Cooperation Administration, Washington, D. C. Office of Industrial Resources.
1 May 59, 29p
Prepared in cooperation with Snell (Foster D.) Inc., New York.

Descriptors: (*Food, Processing), Colloids, Costs, Production, Industrial equipment, Industrial plants, Packaging, Sanitary engineering.
Identifiers: Mayonnaise.

The report covers the procedures, plant equipment, and economics involved in the manufacture of 250,000 pounds of mayonnaise per year. Two manufacturing procedures are covered: (1) Batch mixing or beating; (2) Continuous emulsification or homogenization. Economics of operation for each process are shown for investment comparisons, and include lists of equipment required, labor, utility, and material balances. Formulas for several types of commercial mayonnaise are given. (Author)
PB-177 943 HC$3.00 MF$0.65

6I. Hygiene and Sanitation

STERILIZATION ACTION OF CHLORINE AND IODINE ON BACTERIA AND VIRUSES IN WATER SYSTEMS.
Johns Hopkins Univ., Baltimore, Md. School of Hygiene and Public Health.
For primary bibliographic entry see Field 13B.
AD-430 343 HC$3.00

HYGIENE AND SANITATION RESEARCH IN USSR.
Joint Publications Research Service, Washington, D. C.

4 Mar 68, 21p
Trans. of Gigiena i Sanitariya (USSR) v33 n1 p55-8, 114-6, 121-3 1968.

Descriptors: (*Public health, USSR), Hygiene, Sanitary engineering, Biological contamination, Epidemiology, Immunity, Clostridium botulinum, Clostridium tetani, Periodic variations, Soils.

Contents: Seasonal changes of immunological reactivity in persons working in the open air; Occurrence of Clostridium botulinum and Clostridium tetani in the soil of Armenian SSR; Results and goals of hygienic research in RSFSR.
JPRS-44563 HC$3.00 MF$0.65

THE POTENTIAL HAZARD OF STAPHYLOCOCCI AND MICROCOCCI TO HUMAN SUBJECTS IN A LIFE SUPPORT SYSTEMS EVALUATOR WHILE ON A SIMULATED GT-7 MISSION FINAL REPORT, 19 SEP. - 1 NOV. 1965.
Miami Valley Hospital, Dayton, Ohio. Dept. of Research.
B. S. Horstman, and L. P. Lotter. Sep 67, 33p
NASA-CR-93778, AMRL-TR-67-45
Contract NASA ORDER R-85, AF 33/657/-11716
Date- Sep. 1967 Coll- 33 P Refs

Descriptors: *Astronauts, *Biological effects, *Life support systems, *Staphylococcus, Aerobes, Aerospace medicine, Anaerobes, Human reactions, Microbiology, Pressure suits, Space simulators.

For abstract, see STAR 06 10.
N68-19968 HC$3.00 MF$0.65

6J. Industrial (Occupational) Medicine

OCCUPATIONAL PATHOLOGY AND HYGIENE,
Joint Publications Research Service, Washington, D. C.
A. A. Letavet, A. V. Roshchin, S. I. Ashbel, E. A. Drogichina, and D. M. Zislin. 30 Jan 68, 32p
Trans. o f Gigiena Truda i Professionalnye Zabolevaniya (USSR) n11 p3-19, 36-40 1967.

Descriptors: (*Industrial medicine, USSR), Pathology, Hygiene, Chemical industry, Etiology, Sanitary engineering.

Contents: Soviet labor hygiene for the past 50 years; Soviet occupational pathology for the last 50 years; Labor hygiene in the chemical industry for the past 50 years.
JPRS-44198 HC$3.00 MF$0.65

ABSTRACTS FROM PAPERS PRESENTED AT THE JOINT ANNUAL MEETING OF THE ROCKY MOUNTAIN SECTION OF THE AMERICAN INDUSTRIAL HYGIENE ASSOCIATION AND THE RIO GRANDE CHAPTER OF THE HEALTH PHYSICS SOCIETY.
Sandia Corp., Albuquerque, N. Mex.
For primary bibliographic entry see Field 6R.
For abstract, see NSA 22 08.
SC-M-67-2959 HC$3.00 MF$0.65

6K. Life Support

RESPIRATORY HEAT LOSS WITH HIGH DENSITY GAS MIXTURES.
Final rept. Apr 65-May 66,
Webb Associates, Yellow Springs, Ohio.
Paul Webb, and James F. Annis. 31 May 66, 54p
Contract Nonr-4965 (00)

Descriptors: (*Respiration, *Body temperature), (*Breathing apparatus, Diving), Gases, Mixtures, Helium, Oxygen, Sulfur compounds, Fluorides, Vapor pressure, Water vapor, Scuba divers, Temperature, Measurement, Reduction, Exhaust gases.
Identifiers: Breathing, Body heat loss.

Heat loss from the respiratory tract of resting and working subjects was measured while they were breathing air, 20 percent O2 - 80 percent He, and 20 percent O2 - 80 percent SF6 through an instrumented scuba mouthpiece at 1 atmosphere. Similar data were taken in a hyperbaric wet chamber with air and 20 percent O2 - 80 percent He at 4 ATA, and 4 percent O2 and 96 percent He at 8 ATA. Heat loss was directly proportional to respiratory minute volume and to the product of density and specific heat of each gas mixture. With higher density mixtures, respiratory heat loss was as high as 25 percent of the total heat production, either resting or working. Individual values for the respiratory loss ranged from 0.1 to 2.5 Kcal/min. Respiratory heat loss was reduced by the presence of mouthpiece, since the portion of the airway through which both inspired and expired gas travels heats inspired air, and cools expired air and condenses out some of its water vapor. Methods are given for calculating respiratory heat loss and the densities of different gas mixtures. (Author)
AD-483 972 HC$3.00 MF$0.65

THE BIOCHEMICAL, PHYSIOLOGICAL, AND METABOLIC EVALUATION OF HUMAN SUBJECTS IN A LIFE SUPPORT SYSTEMS EVALUATOR AND ON A LIQUID FOOD DIET.
Final rept. 12 Jun 64-23 Feb 65,
Miami Valley Hospital Dayton Ohio Dept of Research
Bernard J. Katchman, George M. Homer, James P. F. Murphy, Carol A. Linder, and Vickie R. Must. Nov 67, 65p
AMRL-TR-67-72
Contract AF 33 (657)-11716

Descriptors: (*Life support, Diet), Nutrition, Stress (Physiology), Food, Liquids, Ingestion (Physiology), Body weight, Metabolism, Confined environments, Blood analysis, Tables, Space medicine, Statistical analysis.

A 6-week study with 4 students as volunteer subjects was conducted to evaluate their water, caloric, and protein requirements under simulated stresses of aerospace. The subjects spent 28 days in the Life Support Systems Evaluator; 2 subjects wore the MA-10 space suit, unpressurized, for 8 hrs a day. They ate a 1-cycle, 4 meal per day, fresh food diet and a 1-cycle, 4 meal per day, liquid food diet. The only variety in the fresh food diet was the meat and fruit served at each meal. This diet was highly acceptable and did not show monotony even after 21 days. Flavors were the only variety in the liquid food diet: Cherry, vanilla, chocolate, and strawberry. This diet was unacceptable and monotonous, and less acceptable with time. The fresh food diet contained 81 g of protein, 164 g of fat, 166 g of carbohydrate, and 2329 k cal of energy. The liquid food diet contained 70 g of protein, 167 g of fat, 204 g of carbohydrate, and 2444 k cal of energy. The daily requirement of water was about 3300 ml on the fresh food diet and about 2500 ml on the liquid food diet. The liquid food diet was used less efficiently than the fresh food diet. Consequently, the subjects were in negative balance for calcium, potassium, and phosphorus although the concentrations of these elements in the diet were many times that found in the fresh food diet. The caloric value of the diet could support only a 65 kg man without weight loss. All the clinical data including heart rate, blood pressure, and oral temperature were in the normal range and no significant differences were observed due to confinement in the Life Support Systems Evaluator or due to wearing the unpressurized MA-10 space suit. (Author)
AD-668 127 HC$3.00 MF$0.65

A SPIRAL DESIGN FOR SPACE-STATION GREENHOUSES,
Joint Publications Research Service, Washington, D. C.
For primary bibliographic entry see Field 6C.
JPRS-43943 HC$3.00 MF$0.65

THE POTENTIAL HAZARD OF STAPHYLOCOCCI AND MICROCOCCI TO HUMAN SUBJECTS IN A LIFE SUPPORT SYSTEMS EVALUATOR WHILE ON A SIMULATED GT-7 MISSION FINAL REPORT, 19 SEP. - 1 NOV. 1965.
Miami Valley Hospital, Dayton, Ohio. Dept. of Research.
For primary bibliographic entry see Field 6I.
For abstract, see STAR 06 10.
N68-19968 HC$3.00 MF$0.65

6L. Medical and Hospital Equipment

FIELD MEDICAL LABORATORY PROGRAM.
Final development rept. 3 May 65-31 Jan 68,
North American Rockwell Corp Anaheim Calif Autonetics Div
John T. Celentano, Bertram B. Adams, Philip S. Biernacki, Quon Y. Chang, and Arthur J. Getzkin. 29 Feb 68, 205p Rept no. C7-2769/030
Contract DA-49-193-MD-2761

Descriptors: (*Medical laboratories, Mobile), Military medicine, Military requirements, Laboratory equipment, Medical personnel, Models (Simulations), Systems engineering, Instruction manuals, Feasibility studies, Tables.

The primary purpose of the Field Medical Laboratory (FML) program was to perform the necessary research and development leading to a new Field Medical Laboratory for use by the Army Medical Service during the 1970 time frame with capabilities consistent with the requirements for modern laboratory medicine. A Field Medical Laboratory system was defined and described in terms of mission, capabilities, procedures, organization, equipment, supplies, personnel, and facilities. A laboratory model was developed and a feasibility demonstration was performed. Selected representative equipment items were subjected to environmental testing, drawings were completed and procurement specifications were prepared. Step-by-step laboratory procedural manuals and equipment operating and maintenance instructions were developed. Lastly, documentation relating to the FML organization, personnel, and equipment allowances (TO and E) and a revised AR 40-4 pertaining to FML services was developed in addition to a plan for activation and deployment of the FML. The program resulted in the definition, description, development, and evaluation of a feasibility model of an advanced Field Medical Laboratory system designed to provide effective medical laboratory services on a world-wide basis in the 1970 time period. The total development of the FML system can be realistically achieved within the required time frame. (Author)
AD-667 942 HC$3.00 MF$0.65

SAFE STANDARD OF AERATION FOR ETHYLENE OXIDE STERILIZED SUPPLIES,
Walter Reed Army Inst of Research Washington D C
Teruo Matsumoto, Robert Hardaway, K. C. Pani, Corinne M. Sater, and Duane E. Bartak. 1968, 7p
Availability: Published in Archives of Surgery, v96 p464-70 Mar 1968.

Descriptors: (*Medical equipment, Sterilization), (*Sterilization, Standards), Ethylene oxide, Surgical instruments, Cannulation, Air, Gas chromatography, Hematology, Histology, Metals, Plastics, Rubber.
Identifiers: Aeration.

The biologic reaction of the remaining ethylene oxide sterilized cardiac and Foley catheters after various aeration periods were evaluated and correlated with ethylene oxide content in the catheters vs aeration time. The study indicated that cardiac

catheter (plastic) required at least 48 hours' aeration period while Foley catheter (rubber) needed a minimum 72 hours' aeration period for clinical use, after sterilization of these materials with ethylene oxide. (Author)
AD-668 134 Not available from CFSTI.

INVESTIGATION OF OPERATION OF AUTOMATIC RESPIRATORY VALVES,
Foreign Technology Div Wright-Patterson AFB Ohio
L. I. Nemerovskii. 7 Jul 67, 17p Rept no. FTD-MT-67-65
Edited machine trans. of Meditsinskaya Promyshlennost SSSR, n9 p13-9 1965.

Descriptors: (*Respirators, Pneumatic valves), Automatic, Gas flow, Oxygen, USSR.
Identifiers: Translations.

A new method and apparatus for determining the resistance and gas bypass of self-regulating respiratory valves is described. Bypass is defined as the amount of gas passing through the valve in the opposite direction during a respiratory cycle. The relationship between valve resistance and gas bypass has significance for oxygen-breathing apparatus, particularly with gravitational valves, in which too much bypass can conceivably lead to patients' hyperkapnia. Gravitational, coil and gasproof valves were tested. In the study of the gravitational valve, coincidence of theoretical and experimental values for stationary flow and sinusoidal respiratory pulse flow was found. Closing of the valve in the idle phase depends on 3 factors: (1) the vacuum required for drop of the valve, (2) valve inertia and friction, and (3) valve weight. For valves up to 3 g, the first factor proved decisive Greater valve weight at the same ventilation will result in less slippage. Coil valves and gasproof valves were found to act almost the same as the gravitational. Dependence of resistance on ventilation is a constant for gravitational valves but is a variable for coil valves. Absolute slippage values were about the same for all sizes of coil valves. Theoretical and experimental results agreed closely, and it was concluded that the slippage of a self-regulating valve of any kind can be approximately calculated if the geometric parameters and resistance to the operational conditions under study are known. (Author)
AD-668 235 HC$3.00 MF$0.65

RESEARCH ACTIVITIES IN THE FIELD OF MATERIALS SCIENCE.
North Carolina Univ Chapel Hill Materials Research Center
For primary bibliographic entry see Field 11G.
AD-668 501 HC$3.00 MF$0.65

6M. Microbiology

STUDIES ON NOSEMA (= ENCEPHALITOZOON) CUNICULI INFECTION IN MAN.
Progress rept.,
Keio Univ Tokyo (Japan) School of Medicine
Hisakichi Matsubayashi. Jan 68, 6p
ARDG (FE)-J-281-3
Grant DA-CRD-AFE-S92-544-67-G79
See also AD-660 282.

Descriptors: (*Parasitic diseases, Humans), Germ-free animals, Tissue culture, Growth, Parasites, Diagnosis, Japan.
Identifiers: Nosema cuniculi.

The objective of the research is to identify the Nosema parasite to be isolated from human beings. Work was directed toward the method of isolation and identification of the parasite by the establishment of a mouse colony free from Nosema infection and by tissue culture.
AD-667 990 HC$3.00 MF$0.65

THE LOCALIZATION BY ELECTRON MICROSCOPY OF SEVERAL PHOSPHATASE ACTIVITIES IN HEPATOCYTES IN CASES OF INFECTIOUS OR SERUM HEPATITIS.
Nara Medical Coll Kashihara City (Japan)
For primary bibliographic entry see Field 6A.
AD-667 991 HC$3.00 MF$0.65

BIOLOGIC REACTIONS OF CELLULAR ANTIBODIES, WITH SPECIAL REFERENCE TO THEIR IMMUNO-PATHOLOGICAL AND IMMUNO-CHEMICAL PROPERTIES.
Progress rept.,
Kumamoto Univ (Japan) Medical School
Hideo Hayashi. Jan 68, 8p
ARDG (FE)-J-290-3
Contract DAJB17-67-C-0097

Descriptors: (*Antigens + antibodies, Tissue culture), Immunology, Tissue culture cells, Responses, Antigen-antibody reactions, Japan.

Biologic reactions of antibodies in cell were analyzed with respect to their immunopathological and immunochemical properties. The first purpose was to establish the cell system (in culture) useful for the study of the antibody. The second purpose was to confirm the correlation between the chemical structure and biologic reaction of the antibody. The third purpose was to ascertain the significance of the antibody in the immunologic tissue response. The observations will establish a new and fruitful way for an essential understanding of the immunological diseases. (Author)
AD-667 994 HC$3.00 MF$0.65

CBE FACTORS MONTHLY SURVEY NO. 24.
Library of Congress Washington D C Aerospace Technology Div
For primary bibliographic entry see Field 15B.
AD-668 075 HC$3.00 MF$0.65

MOLECULAR GENETIC STUDIES OF RELATIONSHIPS AMONG MYCOPLASMA, L-FORMS AND BACTERIA,
Walter Reed Army Inst of Research Washington D C
Z. A. McGee, M. Rogul, and R. G. Wittler. 1967, 10p
Availability: Published in Annals of the New York Academy of Sciences, v143 n1 p21-30 Jul 28 1967.

Descriptors: (*Mycoplasma, Genetics), Morphology (Biology), Classification, Culture media, Desoxyribonucleic acids, Cell wall, Mycoplasmataceae.
Identifiers: L-form bacteria.

Tests of DNA base composition and base sequence homology performed to estimate the degree of genetic relatedness among the mycoplasma indicate that there is extensive genetic heterogeneity not only among some mycoplasma having different base compositions, but even among some having similar base compositions or isolated from the same host. The degree of this heterogeneity indicates that there is little more justification for including in one genus all those organisms which do not have cell walls than there would be for including in one genus all those organisms that do have cell walls. Much of the former evidence supporting the view that mycoplasma are the L-forms of bacteria is not confirmed by genetic tests. Evidence has been presented that makes this hypothesis unlikely. In addition to defining the genetic relationships among members of the family Mycoplasmataceae, the techniques of molecular genetics can be a valuable aid in identifying isolates thought to represent new mycoplasma species. (Author)
AD-668 188 Not available from CFSTI.

A TRANSPORT MEDIUM FOR SPECIMENS CONTAINING PASTEURELLA PESTIS,
Walter Reed Army Inst of Research Washington D C
D. C. Cavanaugh, S. Vivona, F. L. Gibson, and G. L. Deuber. 1967, 6p
Availability: Published in Bull. Org. Mond. Sante, v37 p455-60 1967.

Descriptors: (*Pasteurella pestis, Culture media), Viability, Effectiveness, Preservation, Diagnosis, Transportation, Military medicine, Vietnam.

A medium, originally designed by Stuart and coworkers and later modified by Cary and Blair, for the maintenance and transport, without multiplication, of pathogenic bacteria contained in bacteriological specimens was tested in the laboratory and in the field in Viet-Nam to determine its effectiveness in preserving specimens known to contain Pasteurella pestis. The results indicate that this medium should be useful in diagnostic plague studies in areas where transport facilities are inadequate. Properly collected clinical specimens, sent to a central laboratory by any means and under any climatic conditions likely to be encountered in the hot tropics, should yield viable Pasteurella pestis for at least 30 days. (Author)
AD-668 191 Not available from CFSTI.

A SEROLOGIC SURVEY FOR ARBOVIRUS ANTIBODIES IN INHABITANTS OF A SOUTHWEST TAIWAN VILLAGE.
Naval Medical Research Unit No 2 Taipei (Taiwan)
For primary bibliographic entry see Field 6E.
AD-668 204 Not available from CFSTI.

1967 RESEARCH CLERKSHIP REPORTS.
Naval Medical Research Unit No 4 Great Lakes Ill
For primary bibliographic entry see Field 6E.
AD-668 219 HC$3.00 MF$0.65

DEVELOPMENT OF A METHOD TO QUANTITATE FOOD-BORNE VIRAL INFECTIVITY.
Wisconsin Univ Madison Food Research Inst
For primary bibliographic entry see Field 6H.
AD-668 453 HC$3.00 MF$0.65

METABOLISM OF C 1 COMPOUNDS BY MICROORGANISMS, PART II.
Final rept. (Part 2),
Sheffield Univ (England) Dept of Microbiology
J. R. Quayle. 31 Oct 67, 30p
AFOSR-68-0809-Pt-2
Grant AF-EOAR-8-64
See also Part I, AD-641 993.

Descriptors: (*Carbon compounds, Metabolism), (*Pseudomonas, Metabolism), Enzymes, Growth, Saccharide phosphates, Ribose, Methane, Amino acids, Biosynthesis, Mutations, Culture media, Formates, Formaldehyde, Succinates, Chromatographic analysis, Great Britain.

An assay was developed for the enzyme system in methane-grown Pseudomonas methanica which catalyses the condensation of formaldehyde with ribose-5-phosphate to give a hexose phosphate. Using this assay system, the enzyme system was partially purified by gel-filtration and ion exchange chromatography. Studies were made of mutants of Pseudomonas AM1 deficient in their ability either to grow on C 1 compounds or to synthesize serine or glycine from succinate. The metabolism of Pseudomonas oxalaticus in mixtures of formate and certain C 2 growth substrates was determined. (Author)
AD-668 463 HC$3.00 MF$0.65

EXPERIMENTAL INFECTION OF COYOTE PUPS WITH VENEZUELAN EQUINE ENCEPHALITIS VIRUS.
Technical rept.,
Dugway Proving Ground, Utah. Biological Div.
David L. Lundgren, David R. Terry, and Keith L. Smart. Nov 66, 17p
DPG-T67-106

Descriptors: (*Venezuelan equine encephalomyelitis virus, *Epidemiology), (*Dogs, *Disease vectors), Resistance (Biological), Virus diseases, In-

fectious diseases, Immunity, Serodiagnosis, Antigens + antibodies, Mice.
Identifiers: Coyotes.

An investigation was undertaken to determine the disposition of coyotes to infection by the virus of venezuelan equine encephalomyelitis, and also to determine onset, height and duration of haemagglutination inhibiting, complement-fixing and virus-neutralizing antibody. In this initial report, it is shown that young coyotes were highly susceptible to the epidemic strain of vee virus used, and that they developed a dose-independent viremia lasting for an average of 3.6 days in 1 to 2 months-old pups, and 2.8 days in 6 to 7 months-old pups. Less than one mouse intra cerebral medial dose (MicId50) may initiate infection within 24 hours. Infection with strain of vee virus led to a characteristic symptomatology, but was characterized by a low incidence of lethality even in very young animals. These results indicate that the coyote may serve as a short term source of vee virus in the natural infection chain. Although the coyote does occur over a wide geographic range including endemic areas, its role as a link in the dissemination chain leading to human communities may nevertheless be minimal because of its low population density. (Author)
AD-804 069 HC$3.00 MF$0.65

STUDIES RELATING TO VIRUS CONTROL,
Joint Publications Research Service, Washington, D. C.
For primary bibliographic entry see Field 6E.
JPRS-43974 HC$3.00 MF$0.65

SOVIET ACHIEVEMENTS IN BREEDING ANTIBIOTIC PRODUCER STRAINS,
Joint Publications Research Service, Washington, D. C.
For primary bibliographic entry see Field 6O.
JPRS-43992 HC$3.00 MF$0.65

DEVELOPMENT OF VIRUS BIOCHEMISTRY AND MOLECULAR BIOLOGY IN THE SOVIET UNION,
Joint Publications Research Service, Washington, D. C.
V. I. Tovarnitskii. 30 Jan 68, 12p
Trans. of Voprosy Virusologii (USSR) n6 p643-50 1967.

Descriptors: (*Viruses, Biochemistry), Enzymes, Proteins, Metabolism, Nucleic acids, Biological laboratories, Reproduction (Physiology), Antimetabolites, Biosynthesis, Genetics, Immunology, Chemotherapy, Virus diseases, Bacteriophages, Reviews, USSR.
JPRS-44197 HC$3.00 MF$0.65

STUDIES ON ARBOR VIRUSES,
Joint Publications Research Service, Washington, D. C.
V. D. Neustroev, T. A. Salagova, T. A. Rezepova, and K. S. Kulikov. 8 Feb 68, 13p
Trans. of Voprosy Virusologii (USSR) n6 p688-91, 755-7 Nov/Dec 67.

Descriptors: (*Arboviruses, Serodiagnosis), Antigens + antibodies, Immune serums, Antigen-antibody reactions, Chikungunya virus, Semliki virus, Saint Louis encephalitis virus, West Nile virus, Tissue culture, Embryonated egg technique, USSR.
Identifiers: Ntaya virus, Sindbis virus.

Brain antigens from Chikungunya, Semliki, St. Louis, West Nile, and Ntaya viruses as well as antigens from Sindbis virus prepared from the brain tissue of suckling mice and from culture fluid after inoculation of a trypsinized culture of chick embryo fibroblasts can be used as antigens for the hemagglutination-inhibition and complement-fixation tests. (Author)
JPRS-44295 HC$3.00 MF$0.65

ANTIGENIC AND IMMUNOGENIC PROPERTIES OF STAPHYLOCOCCAL DELTA-TOXIN,
Joint Publications Research Service, Washington, D. C.
E. V. Rusakova. 13 Feb 68, 8p
Trans. of Zhurnal Mikrobiologii, Epidemiologii i Immunobiologii (USSR) n12 p114-8 1967.

Descriptors: (*Staphylococcus, *Toxins + antitoxins), Antigens + antibodies, Immunity, Hemolysis, Neutralization, Antigen-antibody reactions, Immune serums, USSR.

Staphylococcal delta-toxin has antigenic and immunogenic activity, although it obviously is a relatively weak antigen. Antibodies to delta-toxin discovered with Hoigner's reaction, the ring precipitation test, precipitation in gel, did not neutralize the hemolytic activity of delta-toxin, but had precipitating properties. Antibodies to delta-toxin were discovered in the sera of nonimmunized rabbits. (Author)
JPRS-44341 HC$3.00 MF$0.65

ISOLATION OF THERMORESISTANT MUTANTS OF HERPES SIMPLEX VIRUS USING THE PLAQUE METHOD,
Joint Publications Research Service, Washington, D. C.
A. B. Germanov, and M. I. Sokolov. 4 Mar 68, 10p
Trans. of Voprosy Virusologii (USSR) n2 p182-6 1967.

Descriptors: (*Herpes simplex virus, Mutations), Resistance (Biological), Heat tolerance, Genetics, In vitro analysis, USSR.

The combined use of heat and the plaque method was found to be effective as a method for breeding and making a genetic study of thermoresistant mutants of herpes simplex virus. Seventeen TR mutants were isolated which were more thermoresistant than the initial strain. Heating at 56C for 5-7 minutes totally inactivated the initial virus but only partially inactivated the thermoresistant mutants, which permitted use of this treatment procedure as a factor in breeding TR mutants. (Author)
JPRS-44564 HC$3.00 MF$0.65

ADAPTATION OF RHIZOCTONIA SOLANI KUEHN TO FUNGICIDES,
Joint Publications Research Service, Washington, D. C.
Yu. T. Dyakov. 4 Mar 68, 11p
Trans. of Mikologiya i Fitopatologiya (USSR) n4 p314-20 1967.

Descriptors: (*Fungicides, Effectiveness), Fungi, Plants (Botany), Culture media, Resistance (Biological), Adaptation (Physiology), Boric acids, USSR.

Eight transfers on media containing boric acid led to a 1.5-two-fold increased resistance to boric acid in Rhizoctonia solani. Evidently the main mechanism of increase in resistance is cytoplasmic adaptation. The increased resistance is not fixed in the progeny and disappears after 4-10 transfers on medium without the fungicide. For this reason when using boric acid the danger of appearance of immune forms is negligible, while the developing forms with increased resistance will not transmit this property to their progeny. Small intervals between applications of this agent are sufficient in order to prevent accumulation of resistant forms. (Author)
JPRS-44565 HC$3.00 MF$0.65

GROWTH OF AEROBIC AND ANAEROBIC BACTERIA IN AGAR SUBJECTED TO FREEZING AND DIURNAL FREEZING AND THAWING.
Jet Propulsion Lab., Calif. Inst. of Tech., Pasadena.
G. B. Blank, R. E. Cameron, and N. H. Horowitz. 15 Jun 67, 15p NASA-CR-93790, JPL-TM-33-331
Contract NAS7-100

Descriptors: *Aerobes, *Anaerobes, *Bacteria, *Freezing, *Melting, Culture techniques, Diurnal variations, Soils, Temperature effects.

For abstract, see STAR 06 10.
N68-20092 HC$3.00 MF$0.65

AN EXPERIMENT ON INHIBITING SCHIZOPHYLLUM COMMUNE Fr. DEVELOPMENT Y ANTAGONISM,
National Science Foundation, Washington, D. C.Special Foreign Currency Science Information Program.
Mihailo Krstic. 1968, 7p SFCSI-Agr (TT-67-58010)
Trans. of Zastita Bilja (Yugoslavia) v25 p42-4 1954, tr. by Mihailo Markovic.

Descriptors: (*Wood, Fungus deterioration), (*Fungi, Antimetabolites), Trees, Penicillins, Culture media, Yugoslavia.

The mold of Penicillium crustaceum on artificial substrata and on beech timber showed a clear antagonistic effect on Schizophyllum commune, the most frequent beech xylophagus in the Yugoslav climate. If this fact can also be confirmed under natural conditions, the biological control of wood in forests would be improved. Therefore, further investigations are of theoretical and practical interest. (Author)
TT-67-58010 HC$3.00 MF$0.65

6O. Pharmacology

THE ANAESTHETIC PRESSURES OF CERTAIN FLUORINE-CONTAINING GASES,
Oxford Univ (England)
K. W. Miller, W. D. M. Paton, and E. B. Smith. 1967, 10p
Contract F61052-67-C-0077
Availability: Published in British Journal of Anaesthesia, v39 p910-8 1967.

Descriptors: (*Anesthetics, Pressure), Fluorine, Solubility, Solvents, Dosage, Responses, Reflexes, Lipids, Brain, Great Britain.

The pressures required to abolish the righting reflex of mice have been measured for five gaseous anaesthetics. The ED50 pressures (in atmospheres) found were: N2, 35; CF4, 19; SF6, 6.9; N2O, 1.5; CF2Cl2, 0.4. These data have been collated with other experimental results using mice, in order to obtain a self-consistent set of data for eighteen anaesthetics. With these data the correlation of anaesthetic pressure with olive oil solubility (Meyer-Overton hypothesis) is shown to be superior to that with hydrate dissociation pressure. The best solubility correlation is obtained with solvents of solubility parameter 9 plus or minus 1. (Author)
AD-668 007 Not available from CFSTI.

CBE FACTORS MONTHLY SURVEY NO. 24.
Library of Congress Washington D C Aerospace Technology Div
For primary bibliographic entry see Field 15B.
AD-668 075 HC$3.00 MF$0.65

HYPERBARIC OXYGEN TOXICITY PREVENTION WITH SUCCINATE,
Duke Univ Durham N C Medical Center
For primary bibliographic entry see Field 6T.
AD-668 277 Not available from CFSTI.

ORGANIZATION OF THE PHARMACEUTICAL SERVICE,
Foreign Technology Div Wright-Patterson AFB Ohio

M. M. Lytvynenko, and I. M. Hubskyi. 13 Jul 67, 759p Rept no. FTD-HT-66-599
Edited trans. of mono. Orhanizatsiya Farmatsevtychnoyi Spravy, Kiev, 1962 454p.

Descriptors: (*Pharmacology, Handbooks), Public health, History, Medical personnel, Drugs, Organizations, Management planning, Costs, Wages, Inventory, Medical supplies, USSR.
Identifiers: Translations.

Contents: Brief historical review of the evolution of pharmacy and the pharmaceutical service for the population; Organization of medical care for the population and provision of therapeutic and prophylactic institutes with medical supplies in the USSR; Planning of the activity of the pharmaceutical enterprises of the system of pharmacy administrations; Accounting and bookkeeping in the pharmaceutical institutions.
AD-668 354 HC$3.00 MF$0.65

THE SPASMOLYTIC ACTION OF NEMICOL-5 (t),
Joint Publications Research Service, Washington, D. C.
For primary bibliographic entry see Field 6T.
JPRS-43953 HC$3.00 MF$0.65

MEDICINAL PLANT RESEARCH AND THE DEVELOPMENT OF NEW DRUGS OF VEGETABLE ORIGIN IN THE UKRAINE,
Joint Publications Research Service, Washington, D. C.
Yu. H. Borisyuk, N. P. Maksyutina, T. V. Zinchenko, V. M. Sheludkov, and I. P. Karpus. 11 Jan 68, 44p
Trans. of Farmatsevtychnyi Zhurnal (USSR) v22 n5 p6-38 1967.

Descriptors: (*Drugs, Plants (Botany)), Sources, Pharmacology, Distribution, Cardiac glycosides, Synthesis (Chemistry), Anthoxanthin pigments, Quinones, Naphthalenes, Anticoagulants, Coumarins, Alkaloids, Vegetable oils, Morphology (Biology), Anatomy, USSR.
JPRS-43984 HC$3.00 MF$0.65

SOVIET ACHIEVEMENTS IN BREEDING ANTIBIOTIC PRODUCER STRAINS,
Joint Publications Research Service, Washington, D. C.
S. Yu. Goldat, Yu. E. Bartoshevich, L. N. Borisova, A. V. Vladimirov, and N. D. Duseva. 12 Jan 68, 23p
Trans. of Antibiotiki (USSR) n11 p 971-84 1967.

Descriptors: (*Antibiotics, Biosynthesis), Mutations, Genetics, Radiation effects, Radiological dosage, Penicillins, Streptomycins, Tetracyclines, Effectiveness, USSR.
Identifiers: Oleandomycin, Erythromycin, Florimycin, Novobiocin, Fusidin, Ristomycin, Vancomycin, Kanamycins, Griseofulvin, Nystatin, Albomycin, Coelicomycin, Levorin.
JPRS-43992 HC$3.00 MF$0.65

STUDY AND DEVELOPMENT OF ANTIBIOTICS IN THE USSR,
Joint Publications Research Service, Washington, D. C.
G. F. Gauze, A. S. Khokhlov, and L. M. Yakobson. 12 Jan 68, 47p
Trans. of Antibiotiki (USSR) n11 p963-71, 999-1012, 1021-7 1967.

Descriptors: (*Antibiotics, Preparation), Medical research, Sources, Germicides, Fungicides, Cancer, Viruses, Chloramphenicol, Tetracyclines, Penicillins, Peptides, Neoplasms, Viability, Stability, USSR.
Identifiers: Cycloserine, Streptothricins.

Contents: Works of Soviet scientists in the field of searching for new antibiotics; Development of antibiotic chemistry in the USSR; System of research in the production of antibiotics in the USSR (1944-1967).
JPRS-44003 HC$3.00 MF$0.65

RESEARCH ON THE INFLUENCE OF DRUGS ON THE CENTRAL NERVOUS SYSTEM.
Joint Publications Research Service, Washington, D. C.
23 Jan 68, 26p
Trans. of Farmacia (Rumania) n10 p605-7, 609-14, 669-77 1967.

Descriptors: (*Central nervous system, *Chemotherapy), Barbiturates, Hypnotics + sedatives, Enzymes, Proteins, Liver, Brain, Drugs, Rumania.
Identifiers: Amobarbital.
JPRS-44117 HC$3.00 MF$0.65

ACTIVITIES OF YUGOSLAV PHARMACEUTICAL ORGANIZATIONS DURING 1967,
Joint Publications Research Service, Washington, D. C.
29 Jan 68, 15p
Trans. of Farmaceutski Glasnik (Yugoslavia) v24 n1 p39-44 1968.

Descriptors: (*Pharmacology, Yugoslavia), Drugs, Medical research, Symposia, Medical personnel, Public health, Reports.
JPRS-44173 HC$3.00 MF$0.65

COMPARATIVE EFFECT OF APROLIDINE AND ATROPINE ON THE TOXICITY OF SOME ORGANOPHOSPHORUS COMPOUNDS,
Joint Publications Research Service, Washington, D. C.
For primary bibliographic entry see Field 6T.
JPRS-44290 HC$3.00 MF$0.65

DIFFERENCES BETWEEN TETRAODONTOXIN AND NOVOCAIN IN MECHANISM OF DEPRESSING ACTION ON FROG SKELETAL MUSCLE FIBERS,
Joint Publications Research Service, Washington, D. C.
B. I. Khodorov, and E. G. Vornovitskii. 8 Feb 68, 9p
Trans. of Byulleten Eksperimentalnoi Biologii i Meditsiny (USSR) n11 p34-7 1967.

Descriptors: (*Local anesthetics, Pharmacology), Muscles, Electrophysiology, Sodium, Permeability, USSR.
Identifiers: Tetraodontoxin.

Until recently most investigators believed that the differences between novocain and tetraodontoxin in their effects on an excitable membrane consist only in the fact that tetraodontoxin impairs the sodium permeability of the membrane in lower concentrations than does novocain and that, unlike novocain, it does not change the potassium permeability of the membrane. The results of our study show that these differences also apply to the mechanism of action of tetraodontoxin on sodium permeability. Tetraodontoxin blocks the sodium channels while novocain inactivates the mechanism that keeps them open to depolarization. (Author)
JPRS-44296 HC$3.00 MF$0.65

TOXICOLOGIC EVALUATION OF UREA, 1- (2-CHLOROETHYL)-3- (2-NORBORNYL)-1-NITROSO- (NSC - 88106).
Research rept.,
Mason Research Inst., Worcester, Mass.
Zareh Hadidian. 9 Jan 67, 71p
Contract PH-43-65-51

Descriptors: (*Cancer, Chemotherapeutic agents), (*Chemotherapeutic agents, Toxicity), Chemical analysis, Dosage, Toxic tolerances, Bone marrow, Lymphatic system, Liver, Kidneys, Pathology, Histology, Biopsy, Hematology, Blood chemistry, Tables.
Identifiers: Chloroethyl norbornyl nitroso ureas.

The systemic toxicity of Urea, 1- (2-chloroethyl)-3- (2-norbornyl)-1-nitroso- (NSC-88106) was evaluated by the oral route in mice, rats, dogs and monkeys; it proved to be quite similar to that of its cyclohexyl analogue, NSC 79037. This compound, NSC 88106, had the same type of delayed toxicity. Its LD50 was 56 mg/kg in mice and 84 mg/kg in rats. In the dog and the monkey it produced qualitatively the same lesions that were obtained with NSC 79037: (1) bone marrow depression, (2) atrophy of lymphoid tissue (3) pathology of liver and (4) pathology of kidneys. Quantitatively, there were differences in the severity of the lesions produced by the two compounds at the same dose level. With NSC - 88106, the first three were less severe and the fourth was more severe. The effects on the liver, bone marrow and lymphoid tissue were more striking in the dog while the effect on the kidney was more striking in the monkey. This latter was also true in the case of NSC - 79037. (Author)
PB-178 021 HC$3.00 MF$0.65

REPEATED DOSE TOXICITY STUDIES ON NSC 109229, RE 82-TAD-8 (SQUIBB) FOLLOWING DAILY I.V. ADMINISTRATION TO A RHESUS MONKEY. ADDENDUM.
Research rept.,
South Shore Analytical and Research Lab., Inc., Islip, N. Y.
Nathan Rakieten, Philip S. Schein, and Ruth D. Davis. 1 Feb 68, 12p
Addendum to report of January 4, 1968.

Descriptors: (*Cancer, Chemotherapeutic agents), (*Chemotherapeutic agents, Toxicity), Hydrolases, Dosage, Toxic tolerances, Body weight, Appetite, Leukocytes, Liver function tests, Pathology, Hematology, Blood chemistry, Tables.
Identifiers: Asparaginase.

NSC 109229, L-Asparaginase Re 82-TAD-8 (SQUIBB), was administered I.V. to a Rhesus monkey in a dose of 500 I.U./kg, B.I.D. x 5. This dose regimen resulted in a loss of body weight associated with a decrease in food consumption, decrease in WBC, BSP retention, slight pyrogenic effect after the first dose and a fatty liver. Plasma levels following dosage were comparable with those obtained with previous batches of L-Asparaginase. (Author)
PB-178 022 HC$3.00 MF$0.65

REPEATED DOSE TOXICITY STUDIES ON NSC 82196 FOLLOWING WEEKLY ORAL ADMINISTRATION TO DOGS.
Research rept.,
South Shore Analytical and Research Lab., Inc., Islip, N. Y.
Nathan Rakieten, Philip S. Schein, and Ruth D. Davis. 29 Jan 68, 61p

Descriptors: (*Cancer, chemotherapeutic agents), (*Chemotherapeutic agents, Toxicity), Toxic tolerances, Dosage, Bone marrow, Liver, Pathology, Blood chemistry, Enzymes, Hematology, Biopsy, Histology, Tables.
Identifiers: Chloroethyl triazeno imidazole carboxamides.

The report describes the effects of weekly oral administration of NSC 82196 to dogs (beagles) at dose levels of 500 mg/kg x 2, 250 mg/kg x 7 and 9, 125 mg/kg x 12 and 63 mg/kg x 15. The tolerable dose was 63 mg/kg/week x 15. At the higher dose levels toxicity was evidenced by bone marrow impairment, biochemical alterations indicative of hepatotoxicity as well as weight loss, anorexia, debilitation and emesis. For the most part these parameters were reversible when the animals were taken off the drug although transient elevations in SGOT and SGPT were noted in some of the animals during the observation period. Since similar changes in SGOT and SGPT were also noted

in the control animal these alterations cannot be unequivocally ascribed to the drug. Qualitatively the overall toxicity noted following weekly dosages of the compound was similar to that seen in dogs (beagles) given daily dosages of the compound (see PB-176 232). The findings noted in the animals treated with the various dose regimens are summarized. (Author)
PB-178 023 HC$3.00 MF$0.65

REPEATED DOSE TOXCITY STUDIES FOLLOWING SUBCUTANEOUS ADMINISTRATION OF NSC 100844, SARAMYCETIN, (X-5079C).
Research rept.,
South Shore Analytical and Research Lab., Inc., Islip, N. Y.
Nathan Rakieten, Philip S. Schein, and Ruth D. Davis. 6 Feb 68, 11p
Contract PH-43-64-932

Descriptors: (*Cancer, Chemotherapeutic agents), (*Chemotherapeutic agents, Toxicity), Injection (Medicine), Dosage, Toxic tolerances, Liver function tests, Histology, Liver, Pathology, Hematology, Blood chemistry, Tables.
Identifiers: Saramycetin.

Saramycetin, NSC 100844, when administered subcutaneously to two beagle dogs in a dose of 8 mg/kg/day x 10 did not result in any gross or histological evidence of local irritation at the sites of injection. Drug treatment, as previously noted (see PB-173 672), caused BSP retention in the animals which was reversible. The livers of the animals were normal on histological examination. Slight weight loss in both animals and a moderate decrease in erythroid elements in one animal were the only other findings of note. No gross or histopathology attributable to the drug was seen in the animals. (Author)
PB-178 024 HC$3.00 MF$0.65

TOXICOLOGIC EVALUATION OF UREA, L-(2-CHLOROETHYL)-3- (2-NORBORNYL)-1-NITROSO- (NSC-88106).
Final research rept.,
Mason Research Inst., Worcester, Mass.
Ulrich Schaeppi, and Andras Fabry. 31 Jan 68, 89p
Contract PH-43-65-51

Descriptors: (*Cancer, Chemotherapeutic agents), (*Chemotherapeutic agents, Toxicity), Toxic tolerances, Dosage, Hematology, Hemorrhage, Leukocytes, Kidneys, Liver, Pathology, Blood chemistry, Tables.
Identifiers: Chloroethyl norbornyl nitroso ureas.

Toxic effects of NSC-88106 were investigated in a total of 26 beagles and 8 Rhesus monkeys. The oral treatment with high doses produced temporary leukopenia and occasional hemorrhages followed by delayed hepatotoxicity and nephrotoxicity. Severe leukopenia and ultimately death occured in 1 out of 4 dogs which was treated with repeated daily doses of 2.5 mg/kg/day and in one dog which received a single dose of 30 mg/kg/day. The repeated daily treatment with 1.25 and 0.625 mg/kg/day (for 14 days) elicited temporary leukopenia, delayed dose related hepatotoxicity, and in some dogs delayed nephrotoxicity. Furthermore, several dogs after a prolonged observation period showed histopathological evidence of irreversible changes of liver and kidneys. In 2 monkeys, the treatment with repeated doses of 5 mg/kg/day or with 2.5 mg/kg/day for 15 days, led to delayed severe renal toxicity and ultimately death. Monkeys also exhibited moderate delayed hepatotoxicity while bone marrow depression was negligible. (Author)
PB-178 025 HC$3.00 MF$0.65

DRUG DIGESTS FROM THE FOREIGN LANGUAGE LITERATURE VOL. 3, NO. 8, 1967-1968.
National Science Foundation, Washington, D. C. Special Foreign Currency Science Information Program.
1967, 63p SFCSI-HEW-NLM (TT-67-51417/8)
A collection of comprehensive digests from report on effects on drugs in 50 non-English journals.

Descriptors: (*Pharmacology, Reports), Psychotropic agents, Central nervous system, Autonomic nervous system, Anesthetics, Analgesics + antipyretics, Respiration, Cardiovascular system, Diuretics, Hematology, Anticoagulants, Gastrointestinal system, Metabolism, Children, Pregnancy, Sex hormones, Diabetes, Chemotherapeutic agents, Cancer, Antibiotics, Vaccines, Diagnosis, Antimalarials, Poisoning, Reviews.

Contents: Central nervous system, incl. psychotropic drugs; Autonomic nervous system; Anesthetics; Analgesics and antipyretics; Respiration; Cardiovascular system and diuretics; Hematology and anticoagulants; Gastrointestinal tract, liver and pancreas (External secretion); Metabolism; Pediatrics; Pregnancy, contraceptives and teratogenic effects; Dermatology; Hormones - adrenal cortex and anabolic agents; Hormones - sex; Hormones - pancreas (Internal secretion), oral antidiabetics; Chemotherapeutics and antibiotics; Cytostatics; Sera and vaccines; Diagnostic agents; Miscellaneous and reviews.
TT-67-51417/8 HC$3.00 MF$0.65

6P. Physiology

RESPIRATORY HEAT LOSS WITH HIGH DENSITY GAS MIXTURES.
Webb Associates, Yellow Springs, Ohio.
For primary bibliographic entry see Field 6K.
AD-483 972 HC$3.00 MF$0.65

ENZYMATIC ADAPTATION RELATED TO CARBOHYDRATE AND, FAT METABOLISM IN ANIMAL BODY.
Tokyo Biochemical Research Foundation (Japan)
For primary bibliographic entry see Field 6A.
AD-667 976 HC$3.00 MF$0.65

MECHANISMS SUBSERVING COLOR CODING IN THE VERTEBRATE RETINA.
Rept. no. 6 (Final) Oct 66-Jan 68,
Keio Univ Tokyo (Japan) School of Medicine
Tsuneo Tomita. Mar 68, 40p
ARDG (FE)-J-228-6
Grant DA-CRD-AG-S92-544-67-G57

Descriptors: (*Color vision, Vertebrates), (*Photoreceptors, Color vision), Retina, Electroretinography, Responses, Fishes, Cephalopoda, Absorption spectrum, Electrophysiology, Japan.

The responses used as indices of studying color reception are potential changes with latencies of several msec recorded from within single photoreceptors using micropipette electrodes having tip diameters less than 0.1 micron. Single carp cones are used for the study, but single octopus photoreceptors are also used to provide matrials for discussion of the significance of the receptor potential upon the flow of information within the receptor. The intracellular placement of the electrode is achieved by mounting the retina on a vibrating table which gives it a large acceleration against the slowly advancing electrode tip. The electrode penetration is signalled by the appearance of a resting potential of 30 - 40 mV. In single carp cones, responses to light are hyperpolarizing. The response spectra studied statistically are classified into three groups in terms of wavelengths of maximum sensitivity. These are in close agreement with those of the absorption spectra of single goldfish cones reported by Marks and MacNichol. The response of single octopus photoreceptors, studied as a control, is a graded sustained depolarization, as common in most invertebrate photoreceptors. The action spectrum calculated therefrom agrees well with the absorption spectrum of the receptor photopigment. Evidence is provided that each octopus photoreceptor is selectively sensitive to a certain plane of polarized light. (Author)
AD-667 977 HC$3.00 MF$0.65

ELECTROGRAPHIC DATA ON THE OPERATION OF 'BIOLOGICAL CLOCKS' OF THE HUMAN BRAIN.
APL Library Bulletin Translation Series,
Johns Hopkins Univ Silver Spring Md Applied Physics Lab
L. G. Voronin, and V. F. Konovalov. 30 Jan 68, 18p Rept no. APL-TG-230-T542
Contract NOw-62-0604
Trans. of Voprosy Psikhologii (USSR) n6 p87-94 1966, tr. by C. R. Haave.

Descriptors: (*Rhythm (Biology), Electrophysiology), Brain, Electroencephalography, Galvanic skin response, Time, Reflexes, Stimulation, USSR.
Identifiers: Translations.

Some electrographic indices (EEG, GSR and OR) that are manifested as a time reflex in trace conditioning were investigated using a polygraph recording procedure. The experimental schedule was as follows: a sound stimulus (the conditioning stimulus) was coupled with a light stimulus (the reinforcement). The interval between these stimuli was 60 seconds. The dynamics of electrographic reactions in the process of forming the link between the coupled stimuli is described. The possible mechanisms involved in marking-off time by the human brain are discussed. (Author)
AD-668 013 HC$3.00 MF$0.65

AUTOKINESIS AND FELT EYE POSITION.
Naval Training Device Center Orlando Fla
For primary bibliographic entry see Field 5J.
AD-668 015 HC$3.00 MF$0.65

SYNTHESIS OF ALPHA-MERCAPTOACETAMIDINIUM CHLORIDES VIA THE CORRESPONDING PHOSPHOROTHIOATES.
Illinois Univ Chicago
Terry T. Conway, Aboo Shoeb, and Ludwig Bauer. 15 Nov 67, 5p
Contract DA-49-193-MD-2047
Availability: Published in Journal of Pharmaceutical Sciences, v57 n3 p455-9 Mar 1968.

Descriptors: (*Radioprotective agents, Synthesis (Chemistry)), (*Organic sulfur compounds, Radioprotective agents), (*Organic nitrogen compounds, Radioprotective agents), Thiols, Amines, Amides, Chlorides, Phosphorus compounds, Hydrolysis, Spectra (Infrared), Nuclear magnetic resonance.
Identifiers: *Mercapto acetamidinium chlorides.

A facile synthesis of alpha-mercaptoacetamidinium chlorides is described. The procedure consists of treating alpha-chloroacetamidinium chlorides with trisodium phosphorothioate that formed the corresponding S-alkyl phosphorothioates. The latter were not isolated, but were hydrolyzed in the reaction medium by hot dilute acid to furnish the required products. (Author)
AD-668 039 Not available from CFSTI.

VISUAL PERFORMANCE FOLLOWING HIGH INTENSITY FLASHES.
Rept. no. 3 (Final), 16 May 66-15 May 67,
Ohio State Univ Research Foundation Columbus
Norma D. Miller, Vincent M. King, and John Schoessler. Jan 68, 97p
Contract AF 41 (609)-3078
See also AD-647 339.

Descriptors: (*Flashblindness, Recovery), Vision, Illumination, Adaptation (Physiology), Retina, Afterimages, Brightness, Statistical analysis, Thresholds (Physiology).

Three separate investigations into various areas of visual function at high levels of adaptation are reported. The reciprocity relationship between duration and intensity was studied for flashes of the order of 10 to the 7th power td.sec and for durations of 1.2 msec and 1.5 sec. There was approximately a 40% increase in recovery times for Sloan-Snellen test letters following the longer flashes. The effect of varying the interval between two 250 millimicron sec flashes on the subsequent recovery times was investigated. The interval between flashes was varied from zero to 1 msec in 100 microsec increments. The total integrated luminous energy in the flashes was of the order of 10 to the 7th power td.sec. There was a statistically significant change in recovery time with the interval between flashes at the 5% level. The 700 microsec interval resulted in an 18% increase in recovery compared with the zero interval for 630 mL targets. This is equivalent to more than doubling the energy in the zero interval or 500 microsec duration case. In the third portion of the work, increment thresholds were measured for 45' monochromatic flashes superimposed on a 10 degree white light background of various illuminance levels from 10 td to 50,000 td. At the higher levels, marked notches appear in the sensitivity function at 570 millimicrons and 470 millimicrons as previously reported by Sperling. Analysis of the results show a striking similarity with the purity threshold curve and with MacAdam's ellipse for the white point of the chromaticity diagram. (Author)
AD-668 131 HC$3.00 MF$0.65

A RENEWAL THEORETIC APPROACH TO A FIRST PASSAGE TIME PROBLEM OCCURRING IN A NEURON FIRING MODEL.
Johns Hopkins Univ Baltimore Md Dept of Statistics
For primary bibliographic entry see Field 6D.
AD-668 149 HC$3.00 MF$0.65

VASCULAR ALTERATIONS IN EXPERIMENTAL HYPERTENSION,
Pennsylvania Univ Philadelphia Bockus Research Inst
For primary bibliographic entry see Field 6E.
AD-668 196 Not available from CFSTI.

EVALUATION OF POINTING TO A SHARP EDGE.
Washington Univ Seattle Dept of Civil Engineering
For primary bibliographic entry see Field 15D.
AD-668 260 HC$3.00 MF$0.65

(3H)URACIL ACCUMULATION IN MOTOR NEURONS COMPARED WITH THAT OCCURRING IN BLOCKS OF NERVE TISSUE, LIVER, MUSCLE AND PLASMA IN THE RAT,
State Univ of New York Brooklyn Downstate Medical Center
D. H. Ford, and B. Blatt. 10 Feb 67, 10p
Contract Nonr-4018 (00), Grant PHS-NB-456802
Availability: Published in Journal of the Neurological Sciences, v9 p9-17 1968.

Descriptors: (*Nerve cells, Pyrimidines), (*Pyrimidines, Tracer studies), Nucleotides, Tritiated compounds, Tissues (Biology), Brain, Labeled substances, Chromatographic analysis.
Identifiers: Uracils.

Male Wistar rats were injected intravenously with (3H)uracil and killed at varying time intervals thereafter. Analysis of the distribution of 3H-activity in plasma, liver, muscle, brain, spinal cord grey matter and ventral horn motor neurons demonstrated that brain and muscle tissue accumulation of 3H was considerably lower than in liver and plasma. This observation appears to confirm the presence of a blood-brain barrier restricting entry of uracil into the brain, as well as the presence of some other barrier restricting entry into muscle. Analysis of 3H accumulation in the motor neurons, however, demonstrated that nerve cells were capable of accumulating virtually as much labeled material as the liver, on an equivalent weight basis. Thus, the labeled material in the neurons appears to have penetrated any 'barrier' rather freely. This rather significant accumulation of labeled material by neurons was apparently masked by the very low accumulation occurring in the surrounding neuropil, which is of far greater volume. Chromatographic analysis of KOH or $HClO_4$ hydrolysates and TCA extracts revealed that most of the radioactivity present in brain, muscle, liver and plasma was present as uracil and its metabolic derivatives. (Author)
AD-668 278 Not available from CFSTI.

CONNECTIVE TISSUE COMPOSITION OF CANINE ARTERIES. EFFECTS OF RENAL HYPERTENSION,
Pennsylvania Univ Philadelphia Bockus Research Inst
For primary bibliographic entry see Field 6E.
AD-668 279 Not available from CFSTI.

AUTONOMIC CORRELATES OF EYE MOVEMENT BURSTS DURING STAGE REM SLEEP,
Navy Medical Neuropsychiatric Research Unit San Diego Calif
Lawrence F. Spreng, Laverne C. Johnson, and Ardie Lubin. 1968, 16p Rept no. NMNRU-67-10
Availability: Published in Psychophysiology, v4 n3 p311-23 1968.

Descriptors: (*Sleep, Electrophysiology), Autonomic nervous system, Electroencephalography, Respiration, Galvanic skin response, Pulse rate, Psychophysiology.
Identifiers: Rapid eye movements, Finger pulse responses, Skin potential responses.

During stage REM sleep, eye movements were found to be distributed in discrete bursts of rapid eye movement (REM-bursts). REM-burst time averaged approximately 10 percent of stage REM sleep and the rate within a subject was consistent from epoch-to-epoch and night-to-night. Consistent subject biases in eye movement direction were also found. Within subject correlations were obtained between REM-burst time and autonomic activity. Significant positive correlations were found for respiration rate and number of finger pulse responses. There were positive but insignificant correlations with electrodermal activity, heart rate and decreases in respiration amplitude. Autonomic variability was not significantly associated with REM-burst time. (Author)
AD-668 288 Not available from CFSTI.

STUDIES OF BINAURAL INTERACTION.
Tracor Inc Austin Tex
For primary bibliographic entry see Field 5J.
AD-668 337 HC$3.00 MF$0.65

MICROCIRCULATION DYNAMICS.
Interim rept.,
California Univ San Diego La Jolla Dept of the Aerospace and Mechanical Engineering Sciences
Y. C. B. Fung. 3 Apr 68, 12p
AFOSR-68-0841
Grants AF-AFOSR-1186-67, NSF-GK-1415
Availability: Published in Biomedical Sciences Instrumentation, v4 p310-20 1968.

Descriptors: (*Erythrocytes, Mechanical properties), (*Capillaries, Blood circulation), Microscopy, Instrumentation, Membranes (Biology), Elasticity, Thickness, Osmotic pressure, Geometric forms, Spheres, Stresses, Mathematical analysis.
Identifiers: Bioinstrumentation, Biomechanism, Bioengineering.

Using the red blood cell as an example, the theme is developed that optical microscopy, pushed to the limit of resolution with the help of numerical image analysis, has much to offer to microcirculation research. The theoretical implications of the biconcave shape of the red cell are discussed. The consequences of the fact that a normal biconcave red cell can be transformed into a sphere in a hypotonic medium are presented. These considerations show that a detailed knowledge of dimensional changes of the red cell will yield information about the membrane elasticity, pressure differential, and thickness distribution. (Author)
AD-668 406 Not available from CFSTI.

ANTIBODY CONCENTRATION AND TEMPERATURE AS DETERMINANTS OF IN VITRO SENSITIZATION AND HISTAMINE RELEASE IN ISOLATED CARDIAC TISSUES,
Stanford Univ Calif Dept of Physiology
Gerald G. Vurek, Denis J. Prager, and George A. Feigen. 1967, 11p
Contract Nonr-225 (46), Grant PHS-HE-03693
Availability: Published in The Journal of Immunology, v99 n6 p1243-53 1967.

Descriptors: (*Heart, *Anaphylaxis), In vitro analysis, Histamine, Secretion, Antigen-antibody reactions, Gamma globulin, Temperature, Immunology.

The process of cardiac anaphylaxis was studied on the isolated hearts and separate cardiac tissues obtained from actively and passively sensitized guinea pigs, as well as on tissues obtained from normal animals and sensitized in vitro with rabbit antiovalbumin. The results of studies made on whole hearts and the individual tissues confirm that the histaminase activity of the organ is negligible, that the atria, which comprise only 12% of the mass of the heart, account for 50% of the histamine release of the whole organ, and that the histamine content of the right atrium is 44% greater than that of the left. The degree and velocity of in vitro sensitization was shown to be influenced by antibody concentration, the proportion of specific to nonspecific gamma-globulin molecules and by temperature, even though the overall magnitude of physical binding of antibody proved to be temperature independent. At a constant degree of sensitization, histamine release depends on the concentration of antigen used for challenge. The anaphylactic release of histamine from both actively and passively sensitized atria takes place in the temperature range 24 to 44C and has a maximum at 40C. Following challenge, atrial histamine release reaches a maximum at 1.5 min, with a velocity dependent on the temperature. From the variation of initial velocity with temperature in tissues having a constant degree of sensitization, it was possible to show the activation energy of histamine release to be 23 kcal. (Author)
AD-668 429 Not available from CFSTI.

THE SPECIFIC INHIBITION OF IN VITRO ANAPHYLAXIS AND HISTAMINE RELEASE BY DIALYZABLE MATERIAL FROM RAGWEED POLLEN,
Stanford Univ Calif Dept of Physiology
G. A. Feigen, E. Sanz, Roberta L. Meyers, and D. H. Campbell. 1968, 16p
Contract Nonr-225 (46), Grant PHS-HE-03693-07
Prepared in corporation with California Inst. of Technology, Pasadena.
Availability: Published in International Archives of Allergy and Applied Immunology, v32 p174-90 1967.

Descriptors: (*Anaphylaxis, Inhibition), Histamine, Secretion, Pollen, Antigen-antibody reactions, Immune serums, Heart, Tissue extracts, Immunology.

Passive sensitization of isolated normal guinea-pig heart muscle with two different preparations of rabbit antiragweed serum failed to show a correlation between precipitating antibody and ability to sensitize. The dialyzable, small molecular weight fraction obtained from aqueous extracts of ragweed pollen inhibited the anaphylactic reaction when challenge was made with a nondialyzable fraction. (Author)
AD-668 430 Not available from CFSTI.

Group 6P—Physiology

RESPONSES OF THE VASCULAR SYSTEM IN RELATION TO THE HORMONE BACKGROUND.
Final scientific rept.,
Edinburgh Univ (Scotland) Dept of Physiology
L. M. Pickford. 31 Dec 67, 18p
AFOSR-68-0812
Grant AF-EOAR-17-65

Descriptors: (*Vasoactive agents, Pituitary hormones), Blood pressure, Epinephrine, Levarterenol, Nerves, Responses, Autonomic nervous system, Blood vessels, Muscles, Electrolytes (Physiology), Sympatholytic agents, Parenteral infusions, Great Britain.

After chronic sympathectomy in the dog, adrenaline infusions restore oxytocin vasodilation up to the 11th day. Even when nerve transmission has recovered (day 204) the normal response to adrenaline was not seen. Marked changes in plasma cation and water concentrations do not affect the response to oxytocin, which is also unrelated to the adrenals and to beta blockade. (Author)
AD-668 476 HC$3.00 MF$0.65

DISTRIBUTION OF BIOLOGICALLY ACTIVE COMPOUNDS WITHIN THE BODY.
Final scientific rept. 1 Mar 67-29 Feb 68,
Karolinska Institutet Stockholm (Sweden) Dept of Physiology
U. S. von Euler. 31 Mar 68, 9p
AFOSR-68-0810
Grant AF-EOAR-18-67

Descriptors: (*Autonomic nervous system, *Amines), Granules, Nerves, Levarterenol, Heart, Eye, Muscles, Local anesthetics, Decaboranes, Neuromuscular transmission, Biosynthesis, Reserpine, Adenosine phosphates, Sweden.
Identifiers: Catecholamines.

Research was carried out concerning the synthesis, uptake and release of catecholamines in organs and subcellular particles and the effect of various factors on these processes. Presented in this report are ten papers which were prepared and printed or are in press. Papers 1 - 5 deal with uptake and release processes of catecholamines in isolated granules from adrenergic nerves. Papers 6 - 10 deal with various detail problems related to uptake and release phenomena. (Author)
AD-668 481 HC$3.00 MF$0.65

GANGLION CELL RESPONSE CHARACTERISTICS FROM THE AREA CENTRALIS IN THE INTACT EYE OF THE CAT.
Army-Navy Joint rept.,
Naval Aerospace Medical Inst Pensacola Fla
Roy H. Steinberg. 14 Feb 68, 45p Rept no. NAMI-1031
USAARU-68-5

Descriptors: (*Ganglia, Retina), Electroretinography, Eye, Afterimages, Stimulation, Thresholds (Physiology), Responses, Illumination, Intensity.

Ganglion cell responses were recorded with microelectrodes from the intact eye to focused spots and annuli of light delivered by a dual-beam ophthalmoscope. Only concentrically organized circular receptive fields were analysed. Thresholds for optimal center and surround stimuli were approximately equal, as were the latencies of on-responses from the center and surround. With whole-field stimulation center-dominance was a function of light intensity. Off-responses and center-surround interaction were observed with brief flashes (5 msec, 10 msec). With increases of flash duration the duration of the on-response did not increase by the full increment of the flash until the flashes were 50 to 80 msec. At high-flash intensities the on-response extended into the off-period and the off-response weakened and disappeared; it occurred with both on-excitation and on-inhibition and for the responses of both center and surround. These intensity effects were also studied in an intracellular recording; at high intensities, the rate of repolarization of the postsynaptic potential decreased, and the latency of repolarization was delayed. (Author)
AD-668 502 HC$3.00 MF$0.65

INVESTIGATIONS IN THE FIELD OF NUTRITION,
Joint Publications Research Service, Washington, D. C.
A. I. Oparin, F. E. Budagyan, V. V. Efremov, A.
Trans. of Voprosy Pitaniya (USSR) v26 n5 p10-62, 84-9 1967.

Descriptors: (*Nutrition, Medical research), Biochemistry, Food, Diet, Vitamins, Hygiene, Toxicity, Pesticides, USSR.

Contents: The achievements of Soviet biochemistry as a theoretical basis for the production of foodstuffs; Fifty years of development and progress in nutrition science; Trends in the development of vitaminology in the Soviet Union during the last fifty years; Some aspects illustrating the development of the biochemistry of nutrition during fifty years of Soviet power; Therapeutic and therapeutic-prophylactic nutrition during the years of Soviet power; Some urgent problems in nutrition hygiene; Status of and prospects for research on the toxicology of pesticides in foodstuffs and the fixing of hygienic standards therefor; Sixteenth scientific session of the Institute of Nutrition, Academy of Medical Sciences USSR.
JPRS-43813 HC$3.00 MF$0.65

CELL RESEARCH AT THE ACADEMY OF SCIENCES USSR,
Joint Publications Research Service, Washington, D. C.
E. Manucharova. 10 Jan 68, 9p
Trans. from Izvestiya (USSR) p5 13 Aug 1967.

Descriptors: (*Nerve cells, Biosynthesis), Proteins, Amino acids, Nerve impulses, Permeability, Nervous system diseases, Mental disorders, Biophysics, USSR.
JPRS-43951
HC$3.00 MF$0.65

SUMMARY OF SOVIET RESEARCH IN EVOLUTIONARY PHYSIOLOGY AND BIOCHEMISTRY,
Joint Publications Research Service, Washington, D. C.
E. M. Kreps. 18 Jan 68, 33p
Trans. of Zhurnal Evolyutsionnoi Biokhimii i Fiziologii (USSR) v3 n5 pi-iv, 373-93 1967.

Descriptors: (*Physiology, Reviews), Ecology, Adaptation (Physiology), Biochemistry, Nervous system, Conditioned reflex, Brain, Primates, Humans, USSR.
Identifiers: Organic evolution.
JPRS-44065 HC$3.00 MF$0.65

DEVELOPMENT OF SOVIET ROENTGENOANATOMY,
Joint Publications Research Service, Washington, D. C.
A. V. Drozdova. 8 Feb 68, 23p
Trans. of Arkhiv Anatomii, Gistologii i Embriologii (USSR) v53 n11 p3-15 1967.

Descriptors: (*Anatomy, *X rays), Medical research, Bone, Digestive system, Respiratory system, Heart, Urinary system, Reproductive system, Nervous system, Body, Blood vessels, Medical examination, Reviews, USSR.

The review examines the methods of roentgenological research and the most important anatomic data obtained in studying the individual systems of the body over the 50 years that roentgenoanatomy has existed in the Soviet Union. (Author)
JPRS-44294 HC$3.00 MF$0.65

QUANTITATIVE RELATIONSHIP BETWEEN STIMULUS AND EFFECT IN THE STATIC ORGAN.
Quantitatieve Betrekking Tusschen Prikkel en Effect Bij Het Statisch Orgaan
National Aeronautics and Space Administration, Washington, D. C.
W. Mulder. Mar 68, 111p NASA-TT-F-11489

Descriptors: *Astigmatism, *Otolith organs, *Semicircular canals, *Sensory stimulation, Animals, Bibliographies, Human reactions, Reflexes, Rotation.

For abstract, see STAR 06 10.
N68-19823 HC$3.00 MF$0.65

CARBON DIOXIDE TOLERANCE STUDIES.
School of Aerospace Medicine, Brooks AFB, Tex.
H. A. Glatte, Jr., G. J. Motsay, and B. E. Welch.
Sep 67, 29p NASA-CR-93751, SAM-TR-67-77
NASA ORDER T-41829-G

Descriptors: *Carbon dioxide, *Environmental tests, *Human tolerances, Acid base equilibrium, Blood, Exercise (physiology), Hypercapnia, Psychomotor performance, Pulmonary functions, Respiratory physiology, Serums, Urine.

For abstract, see STAR 06 10.
N68-20183 HC$3.00 MF$0.65

6Q. Protective Equipment

SOUND ATTENUATION CHARACTERISTICS OF THE NAVY BPH-2 HELMET,
Army Aeromedical Research Unit Fort Rucker Ala
Robert T. Camp, Jr. Mar 68, 25p Rept no. USAARU-68-6

Descriptors: (*Helmets, *Ear protectors), Sound, Attenuation, Hearing, Protection, Psychoacoustics, Performance (Engineering), Aviation medicine, Very high frequency, Ultrahigh frequency.
Identifiers: BPH-2 helmets.

An evaluation of the real-ear sound attenuation characteristics of the Navy BPH-2 helmet was done with procedures and equipment specified by ASA Z24.22-1957. The results show that the BPH-2 has acoustical characteristics superior to the standard Army APH-5 at frequencies from 125 Hz through 1000 Hz. In view of the high attenuation in the speech communications spectrum, it is recommended that this helmet be considered for use by the U. S. Army. (Author)
AD-667 959 HC$3.00 MF$0.65

AIRCREW COOLING STUDY.
Technical memo.,
Johns Hopkins Univ Silver Spring Md Applied Physics Lab
F. Jurgens. Jan 68, 180p Rept no. APL-TG-945
Contract NOw-62-0604

Descriptors: (*Flight crews, Cooling), (*Protective clothing, Flight crews), Naval personnel, Aircraft equipment, Thermal insulation, Air cooled, Liquid cooled, Moisture, Tolerances (Physiology), Metabolism, Environment, Heat transfer.

The naval aviator cannot wear separate garments for the wide variety of thermal environments in which he must work. The results of a study conducted to ascertain the thermal control requirements of these aircrewmen are presented. The study set out to define the heat and moisture removal requirements during ground and flight operations, to learn the effects of various clothing combinations, and to learn the effects of flight conditions on thermal moisture control. The effects of both metabolic activity and environment on body temperature are considered, and various techniques of air and liquid cooling in a variety of garments are then reviewed in order to determine the

most effective ways of keeping body temperatures at reasonable levels. Immediate use of forced-air cooling suits, more precise determination of the limits of 'tolerable' working conditions, and further improvements in the design of liquid-cooled garments are recommended. (Author)
AD-668 139 HC$3.00 MF$0.65

6R. Radiobiology

DISSOLUTION OF THE CONDENSED CHROMATIN STRUCTURES OF ISOLATED THYMOCYTE NUCLEI AND THE DISRUPTION OF DEOXYRIBONUCLEOPROTEIN (BY INORGANIC PHOSPHATE AND A PHOSPHOPROTEIN,
National Research Council of Canada Ottawa (Ontario) Div of Radiation Biology
For primary bibliographic entry see Field 6A.
AD-668 040 Not available from CFSTI.

METHODS FOR STUDYING THE TIME COURSE OF CELL DIVISION IN CLONES FROM INDIVIDUAL L5178Y LEUKEMIA CELLS,
Naval Radiological Defense Lab San Francisco Calif
D. Stuart Nachtwey, Kathleen Kendall, and Roy J. Holloway. 27 Feb 68, 21p Rept no. USNRDL-TR-68-30

Descriptors: (*Radiation effects, *Tissue culture cells), (*Leukocytes, *Cell division), Gels, Fibrin, Culture media, Thrombin, Fibrinogen.

A step-by-step procedure is given for embedding L5178Y cells in fibrin gels so that individual cells may be observed repeatedly from their initial single state up to the formation of a colony. (The method is a modification and extension of the method of Schindler). An experimental example of the types of information obtainable is presented. (Author)
AD-668 164 HC$3.00 MF$0.65

REGENERATION OF LOCALLY IRRADIATED BONE MARROW. II. INDUCTION OF REGENERATION IN PERMANENTLY APLASTIC MEDULLARY CAVITIES,
Walter Reed Army Inst of Research Washington D C
William H. Knospe, Johannes Blom, and William H. Crosby. 23 Sep 67, 7p
Availability: Published in Blood, v31 n3 p400-5 Mar 1968.

Descriptors: (*Bone marrow, *Regeneration), Radiation effects, Hemopoietic system, Parenteral infusions, Radiological dosage.

Marrow cavities permanently aplastic after irradiation were mechanically disrupted and locally injected with bone marrow obtained from an opposite leg. Hemopoietic bone marrow regenerated with restoration of normal parenchymal and sinusoidal architecture. Mechanical disruption alone or intravenous transfusions of isogeneic bone marrow alone failed to induce any evidence of regeneration of the aplastic marrow. (Author)
AD-668 187 Not available from CFSTI.

INHIBITION OF REGENERATION OF PLANARIA BY MIDLETHAL EXPOSURES TO X RAYS,
Naval Radiological Defense Lab San Francisco Calif
Kathleen Kendall, and D. Stuart Nachtwey. 8 May 68, 24p Rept no. USNRDL-TR-68-29

Descriptors: (*Worms, Radiation effects), (*Radiation effects, *Regeneration), X rays, Radiological dosage, Radiation injuries, Sublethal dosage, Survival, Necrosis, Radiation sickness, Radiation tolerance.
Identifiers: Planaria.

The paper reports the results of studies on the radiosensitivity of the planarian worm, Dugesis dorotocephala, and on the effect of X-rays on the capacity to regenerate after decapitation. The LD50/60 of intact worms is 1303 R (95% confidence interval 1198-1408 R). The mean survival time is 33.7 days. Worms decapitated immediately after exposures ranging from 200 to 1600 R regenerate normally even if they die later. Worms decapitated 9 days after exposures to 200 or 400 R, regenerate normally, whereas, after exposures to 800 or 1600 R, they do not. In an experiment in which worms were exposed to 800 R and then decapitated at various times from 1 hour to 55 days after irradiation, it was shown that worms lose and then regain the capacity to regenerate: the curve representing the capacity for normal regeneration as a function of time after irradiation (percentage of worms regenerating normally after being decapitated at various times) falls from 100% at 1 hour to 50% at 3 days to 0% at 7 days. Recovery of capacity starts at 10-14 days and is 50% complete by about day 20 and essentially complete by about day 30. The phenomenon described may prove useful in studies of the relationship between cell population kinetics and recovery from sublethal radiation damage. (Author)
AD-668 330 HC$3.00 MF$0.65

HISTOLOGIC REACTION OF ADULT RAT SKIN AFTER 13 MEV PROTON IRRADIATION AND ITS VIABILITY IN CELL CULTURE.
Rept. for May 64-Jun 66,
School of Aerospace Medicine Brooks AFB Tex
Bobby L. Caraway, and John E. Prince. Feb 68, 19p Rept no. SAM-TR-68-16
Master's thesis.

Descriptors: (*Radiation effects, Skin), Tissue culture, Viability, Growth, Cancer, Etiology, Pathology, Protons, Tissue culture cells, In vivo analysis, In vitro analysis, Theses.

The carcinogenic effects of low energy (13 Mev) protons on adult rat skin were studied in two phases: Phase 1--A pathologic study in which the oncogenesis of proton irradiation was determined eight months postirradiation. Phase 2--Cell culture experiments based on the hypothesis that growth and viability of adult skin cells irradiated in vivo and later cultured in vitro would reveal carcinoma potential before actual tumor formation could be detected. In phase 1, one animal followed the anticipated pattern nine months postirradiation. It was biopsied for culture six times and in each instance gave a consistent growth in vitro. This animal later developed a basal cell carcinoma. In phase 2, no animals provided viable cells in culture at intervals of 5, 30, or 60 days postirradiation. The interval between 60 days and eight months postirradiation unfortunately could not be followed in this study. (Author)
AD-668 452 HC$3.00 MF$0.65

SERUM CHEMISTRY VALUES FOR THE BEAGLE.
Armed Forces Radiobiology Research Inst Bethesda Md
For primary bibliographic entry see Field 6C.
AD-668 475 HC$3.00 MF$0.65

ANNUAL REPORT, JULY 1, 1967.
Brookhaven National Lab., Upton, N. Y.
Nov 67, 228p
Contract AT (30-2)-GEN-16

Descriptors: (*Nuclear physics laboratories, Reviews), Nuclear physics, Particle accelerators, Instrumentation, Radiochemistry, Radiation chemistry, Nuclear engineering, Radiobiology.

For abstract, see NSA 22 08.
BNL-50057 HC$3.00 MF$0.65

FALLOUT PROGRAM.
New York Operations Office (AEC), N. Y. Health and Safety Lab.
For primary bibliographic entry see Field 18H.
For abstract, see NSA 22 08.
HASL-184 HC$3.00 MF$0.65

COMMENT ON THE BIOLOGICAL EFFECTS OF COSMIC RAYS FROM NEARBY SUPERNOVAE.
Maryland Univ., College Park. Dept. of Physics and Astronomy.
H. Laster. Feb 68, 5p NASA-CR-93745, TR-800 Grant NSG-58-60

Descriptors: *Biological effects, *Cosmic rays, *Supernovae, Animals, Diffusion theory, Dosage, Explosions, Galactic radiation, Interstellar radiation.

For abstract, see STAR 06 10.
N68-19937 HC$3.00 MF$0.65

INDEX TO NUCLEAR SAFETY. A TECHNICAL PROGRESS REVIEW BY CHRONOLOGY, PERMUTED TITLE, AND AUTHOR. VOL. 1, NO. 1 THROUGH VOL. 8, NO. 6.
Oak Ridge National Lab., Tenn.
For primary bibliographic entry see Field 18I.
For abstract, see NSA 22 08.
ORNL-NSIC-41 HC$3.00 MF$0.65

AIR MONITOR FOR 239 PU UTILIZING SEMICONDUCTOR DETECTOR,
Dow Chemical Co., Golden, Colo. Rocky Flats Div.
For primary bibliographic entry see Field 18D.
For abstract, see NSA 22 08.
RFP-1046 HC$3.00 MF$0.65

ABSTRACTS FROM PAPERS PRESENTED AT THE JOINT ANNUAL MEETING OF THE ROCKY MOUNTAIN SECTION OF THE AMERICAN INDUSTRIAL HYGIENE ASSOCIATION AND THE RIO GRANDE CHAPTER OF THE HEALTH PHYSICS SOCIETY.
Sandia Corp., Albuquerque, N. Mex.
Dec 67, 12p
Conf.-670937

Descriptors: (*Radiation hazards, Symposia), Abstracts, Industrial medicine, Nuclear particles, Radioactive isotopes, Fission neutrons, Tolerances (Physiology), Dose rate, Exposure, Air pollution, Lasers, Lungs.

For abstract, see NSA 22 08.
SC-M-67-2959 HC$3.00 MF$0.65

HAZARDS CONTROL PROGRESS REPORT NO. 28, MAY-AUGUST 1967.
California Univ., Livermore. Lawrence Radiation Lab.
Aug 67, 30p
Contract W-7405-eng-48

Descriptors: (*Radiation hazards, Control), Reports, Dosimeters, Spectroscopy, Dose rate, Radiological contamination, Air pollution, Samplers, Gamma rays, Electronic equipment, Thermoluminescence, Radiation monitors.

For abstract, see NSA 22 08.
UCRL-50007-67-2 HC$3.00 MF$0.65

6S. Stress Physiology

THE BIOCHEMICAL, PHYSIOLOGICAL, AND METABOLIC EVALUATION OF HUMAN SUBJECTS IN A LIFE SUPPORT SYSTEMS EVALUATOR AND ON A LIQUID FOOD DIET.
Miami Valley Hospital Dayton Ohio Dept of Research
For primary bibliographic entry see Field 6K.
AD-668 127 HC$3.00 MF$0.65

DISTANCE DISCRIMINATION IN A SIMULATED SPACE ENVIRONMENT.
Texas Christian Univ., Fort Worth.
For primary bibliographic entry see Field 5H.

Group 65 — Stress physiology

For abstract, see STAR 06 10.
N68-19705 HC$3.00 MF$0.65

MECHANISMS OF REGULATION OF THERMAL HOMEOSTASIS IN THE WORK PROCESS.
Mecanismele Reglarii Homeostaziei Termice in Procesul Muncii
National Aeronautics and Space Administration, Washington, D. C.
N. Gavrilescu, and M. Hilt. Apr 68, 4p NASA-TT-F-11635
Tran- Transl. Into English From Fiziol. Norm. Patol. (Rumania), V. 12, No. 4, 1966 P 297-300

Descriptors: *Homeostasis, *Human body, *Temperature control, *Thermoregulation, Body temperature, Physical work, Physiological responses.

For abstract, see STAR 06 10.
N68-19749 HC$3.00 MF$0.65

EFFECT OF VARIOUS DRINKING PATTERNS ON DIURESIS UNDER HIGH AIR TEMPERATURE AND PHYSICAL STRESS CONDITIONS.
Vliyaniye Razlichnykh Pit'yevyky Rezhimov Na Diurez V Usloviyakh Vysokoy Temperatury Vozdukha I Fizicheskoy Nagruzki
Techtran Corp., Glen Burnie, Md.
F. T. Yeronin. Mar 68, 8p NASA-TT-F-11605
Contract NASW-1695
Coll- 8 P Refs Tran- Transl. Into English From Fiziol. Zh. Sssr (Moscow), V. 49, No. 10, 1963 P 1249-1253

Descriptors: *Dehydration, *Diuresis, *Drinking, *Water balance, *Water loss, High temperature air, Perspiration, Physical work, Urination, Water consumption.

For abstract, see STAR 06 10.
N68-19802 HC$3.00 MF$0.65

AEROSPACE MEDICINE AND BIOLOGY - A CONTINUING BIBLIOGRAPHY WITH INDEXES.
National Aeronautics and Space Administration, Washington, D. C.
Feb 68, 175p NASA-SP-7011/47/

Descriptors: *Aerospace medicine, *Bibliographies, *Biological effects, *Indexes (documentation), Abstracts, Aerospace environments, Manned space flight, Physiological effects, Psychological effects.

For abstract, see STAR 06 10.
N68-20026 HC$3.00 MF$0.65

AEROSPACE MEDICINE AND BIOLOGY - A CONTINUING BIBLIOGRAPHY WITH INDEXES.
National Aeronautics and Space Administration, Washington, D. C. Scientific and Technical Information Div.
Mar 68, 131p NASA-SP-7011/48/
Rean- for Abstract See N68-20026 10-04

Descriptors: *Aerospace medicine, *Bibliographies, *Biological effects, *Indexes (documentation), Abstracts, Aerospace environments, Manned space flight, Physiological effects, Psychological effects.
For abstract, see STAR 06 10.
N68-20027 HC$3.00 MF$0.65

CROSS-VALIDATION OF A BRIEF VESTIBULAR DISORIENTATION TEST ADMINISTERED BY A VARIETY OF PERSONNEL.
Naval School of Aviation Medicine, Pensacola, Fla.
For primary bibliographic entry see Field 5H.
For abstract, see STAR 06 10.
N68-20125 HC$3.00 MF$0.65

PHYSIOLOGY IN THE SPACE ENVIRONMENT. VOLUME 2 - RESPIRATION.
National Academy of Sciences-national Research Council, Washington, D. C.
1967, 147p NASA-CR-93455, PUBL.-1485-B, V. 2
Contract NSR-09-012-036
Conf- Conf. Held By Nas-nrc, Woods Hole, Mass., Jun.-jul. 1966

Descriptors: *Aerospace environments, *Conferences, *Respiratory physiology, Aerospace medicine, Bioinstrumentation, Gravitational effects, Human tolerances, Lungs, Manned space flight, Pulmonary functions, Research, Spacecraft cabin atmospheres.

For abstract, see STAR 06 10.
N68-20151 HC$3.00 MF$0.65

DETERMINATION OF APOLLO EMERGENCY IMPACT LIMITS.
Northrop Space Labs., Hawthorne, Calif.
S. H. Advani, M. S. Estes, C. F. Lombard, and A. Roy. 1966, 122p NASA-CR-92039, NSL-65-179
Contract NAS9-4539

Descriptors: *Heart, *Impact acceleration, *Pathological effects, *Physiological responses, Aorta, Apollo project, Bradycardia, Guinea pigs, Impact damage, Injuries, Monkeys, Vasoconstriction.

For abstract, see STAR 06 10.
N68-20480 HC$3.00 MF$0.65

6T. Toxicology

ACTIVE IMMUNIZATION OF A HUMAN AGAINST NAJA NAJA VENOM.
Preliminary rept.,
Army Medical Research Lab., Fort Knox, Ky.
Herschel H. Flowers. 11 Nov 63, 20p USAMRL-594

Descriptors: (*Venoms, Immunity), (*Reptiles, Venoms), Pathology, Toxicity, Toxins + antitoxins, Toxic tolerances, Determination, Immunology, Neutralization.
Identifiers: NAJA naja, Antivenin.

Seventeen injections of indian cobra naja naja venom were administered to a human subject for the production of an active immunity. The development of a significant level of antivenin was demonstrated by neutralization tests. The immunization procedure produced no significant pathological effects.
AD-432 806 HC$3.00

THE EFFECT OF EDTA ON THE EXTENT OF TISSUE DAMAGE CAUSED BY THE VENOMS OF BOTHROPS ATROX (FER-DE-LANCE) AND AGKISTRODON PISCIVORUS (COTTON-MOUTH MOCCASIN),
Army Medical Research Lab., Fort Knox, Ky.
Herschel H. Flowers, and Charles R. Goucher.
3 Oct 63, 23p USAMRL-596

Descriptors: (*Venoms, Tissues (Biology)), (*Reptiles, Venoms), Hemorrhage, Necrosis, Therapy, Rabbits, Bites + stings, Pathology, Army research, Reptiles, Ethylenedinitrilo tetraacetates.
Identifiers: Sequestering agents, Antivenin, Bothrops atrox, Agkistrodon piscivorus.

Snakebite may produce a systemic as well as local effect. Hemorrhage and tissue necrosis are the local effects of the venoms of the cottonmouth moccasin and the fer-de-lance. The chelating agent EDTA injected immediately following and in the area of envenomation greatly reduces the local effects of these particular venoms. (Author)
AD-432 899 HC$3.00

THE CHEMICAL MODIFICATION OF NECROGENIC AND PROTEOLYTIC ACTIVITIES OF CROTALIDAE VENOM AND THE USE OF EDTA TO PRODUCE A VENOM TOXOID.
Study no. 1,
Army Medical Research Lab., Fort Knox, Ky.
Herschel H. Flowers. 9 Dec 63, 36p USAMRL-599

Descriptors: (*Venoms, Biochemistry), (*Reptiles, Venoms), Necrosis, Antigens + antibodies, Toxins + antitoxins, Inhibition, Tissues (Biology), Ethylenedinitrilo tetraacetates.
Identifiers: Sequestering agents, Agkistrodon piscivorus.

This report represents an investigation of the proteolytic activity, necrolytic activity, and antigenicity of untreated venom and venom which had reacted with ethylenediaminetetraacetic acid (EDTA). Agkistrodon piscivorus venom treated with EDTA lost ability to digest casein. Neither sodium phosphate nor sodium bicarbonate restored this ability. The hemorrhagic and necrotizing activity of this venom was essentially absent following EDTA treatment. EDTA treated venom which did not produce necrosis and hemorrhage stimulated the production of antibodies which neutralized the local and systemic toxic activity of untreated venom. The usefulness of EDTA in the treatment of snakebite should be investigated and attempts should be made to isolate and characterize the necrogenic and proteolytic components of snake venom. (Author)
AD-433 665 HC$3.00 MF$0.65

HYPERBARIC OXYGEN TOXICITY PREVENTION WITH SUCCINATE,
Duke Univ Durham N C Medical Center
Aaron P. Sanders, Richard G. Lester, and Barnes Woodhall. 1967, 6p
Contract N00014-67-C-0251, Grant PHS-GM-14226
Presented at the session on Therapeutics and Pharmacology of the Annual Convention of the American Medical Association (116th), Atlantic City, N. J., 20 Jun 67.
Availability: Published in JAMA v204 n3 p241-6 Apr 15 1968.

Descriptors: (*Oxygen, Toxicity), Protection, Succinates, Pressure breathing, Metabolic diseases, Adenosine phosphates, Tissues (Biology), Convulsive disorders, Brain.

Succinate protection against oxygen toxicity in rats was investigated at oxygen pressures of 5, 7, 9, and 11 atmospheres absolute (atm abs), and compared with protection given by dextrose and malate. Times to convulsions were used for comparison. Dextrose and malate gave no protection. Succinate provided relatively long-term protection at 5 and 7 atm abs oxygen exposures, but showed decreasing protection with increasing pressure. Succinate provided no protection at oxygen pressures of 12 atm abs or higher. A 3:1 sodium succinate:ammonium succinate mixture (0.4M, pH 7.4) solved the problem of alkalosis previously encountered with a sodium succinate solution. The infusion of the 3:1 mixture (6 millimols/kg/hr) in dogs exposed to 5 atm abs oxygen delayed convulsion 5 to 11 times longer than in controls. Intracellular localization and thin layer chromatography studies with succinate-2, 3 14C showed that succinate readily penetrated the blood brain barrier. (Author)
AD-668 277 Not available from CFSTI.

THE SPASMOLYTIC ACTION OF NEMICOL-5 (t),
Joint Publications Research Service, Washington, D. C.
G. Kotev, and A. Somlev. 10 Jan 68, 9p
Trans. of Eksperimentalna Meditsina i Morfologiya (Bulgaria) v6 n3 p142-7 Sep 67.

Descriptors: (*Organic phosphorus compounds, Detoxification), Cholinesterase inhibitors, Paralysis, Acetylcholine, Histamine, Serotonin, Sarin, Soman, Intestines, Contraction, Bulgaria.
Identifiers: Nemicol, Arecoline, Nivaline.

The experiment was conducted on 15 rabbits, 15 guinea pigs and five cats. At various stages, tests were made on the effect of varied concentrations of arecoline, acetylcholine, histamine, serotonine, nivaline, sarin and soman on contractions of the smooth muscles of the small intestines. Different strengths of nemicol-5 (t) were used to relax spasms of the intestines. In some tests, a spasmogenic factor preceded the preparation treatment. (Author)
JPRS-43953 HC$3.00 MF$0.65

COMPARATIVE EFFECT OF APROLIDINE AND ATROPINE ON THE TOXICITY OF SOME ORGANOPHOSPHORUS COMPOUNDS,
Joint Publications Research Service, Washington, D. C.
K. A. Zaitseva. 8 Feb 68, 6p
Trans. of Farmakologiya i Toksikologiya (USSR) v30 n5 p597-9 Sep/Oct 1967.

Descriptors: (*Organic phosphorus compounds, Detoxification), Atropine, Poisoning, Pharmacology, Lethal dosage, USSR.
Identifiers: Aprolidine.

Aprolidine, like atropine, has a protective effect in the poisoning of animals with organophosphorus compounds (phosphacol, pyrophos and armin). Aprolidine has more of a protective effect than atropine. (Author)
JPRS-44290 HC$3.00 MF$0.65

TOXICOLOGIC EVALUATION OF UREA, 1- (2-CHLOROETHYL)-3- (2-NORBORNYL)-1-NITROSO- (NSC - 88106).
Mason Research Inst., Worcester, Mass.
For primary bibliographic entry see Field 6O.
PB-178 021 HC$3.00 MF$0.65

REPEATED DOSE TOXICITY STUDIES ON NSC 109229, RE 82-TAD-8 (SQUIBB) FOLLOWING DAILY I.V. ADMINISTRATION TO A RHESUS MONKEY. ADDENDUM.
South Shore Analytical and Research Lab., Inc., Islip, N. Y.
For primary bibliographic entry see Field 6O.
PB-178 022 HC$3.00 MF$0.65

REPEATED DOSE TOXICITY STUDIES ON NSC 82196 FOLLOWING WEEKLY ORAL ADMINISTRATION TO DOGS.
South Shore Analytical and Research Lab., Inc., Islip, N. Y.
For primary bibliographic entry see Field 6O.
PB-178 023 HC$3.00 MF$0.65

REPEATED DOSE TOXCITY STUDIES FOLLOWING SUBCUTANEOUS ADMINISTRATION OF NSC 100844, SARAMYCETIN, (X-5079C).
South Shore Analytical and Research Lab., Inc., Islip, N. Y.
For primary bibliographic entry see Field 6O.
PB-178 024 HC$3.00 MF$0.65

TOXICOLOGIC EVALUATION OF UREA, L-(2-CHLOROETHYL)-3- (2-NORBORNYL)-1-NITROSO- (NSC-88106).
Mason Research Inst., Worcester, Mass.
For primary bibliographic entry see Field 6O.
PB-178 025 HC$3.00 MF$0.65

6U. Weapon Effects

RECOMMENDATION FOR A SAFER TREATMENT OF WHITE PHOSPHORUS BURNS.
Technical rept.,
Naval Medical Research Unit No 2 Taipei (Taiwan) Dept of Biochemistry
R. Quentin Blackwell. 20 Sep 67, 12p
NAMRU-2-TR-300

Descriptors: (*White phosphorus injuries, Chemotherapy), Copper compounds, Sulfates, Solutions, Absorption (Biological), Toxicity, Effectiveness, Taiwan.

One to three per cent solutions of copper sulfate have been used in the treatment of wound areas of casualties suffering white phosphorus burns. Excessive copper absorption with acute toxicity reportedly has occurred in some cases where such solutions have been left in contact with appreciable areas of open wound for extended intervals of time. Laboratory tests suggest that 0.05 per cent copper sulfate is equally effective. Field trials are recommended. (Author)
AD-668 020 HC$3.00 MF$0.65

BLAST CASUALTY PREDICTION-PAST, PRESENT, AND FUTURE.
Final rept.,
Cosmic Inc Bethesda Md
John J. Shea. Apr 68, 152p Rept no. 127
USNRDL-TRC-67-23
Contract N228 (62479)69512

Descriptors: (*Nuclear warfare casualties, Predictions), (*Buildings, Nuclear warfare casualties), Blast, Statistical analysis, Detonation waves, Pressure, Impact, Surface burst, Mortality rates, Nuclear explosion damage, Urban areas, Wounds + injuries.
Identifiers: Overpressure, Missile impingement, Yield.

The report provides a summary, critique, and extension of techniques for predicting blast casualties from nuclear detonations. We review and analyze the two contrasting approaches previously used, i.e., the study of specialized problems and the extrapolation of empirical casualty statistics. We derive explicit, analytic expressions for translational casualty ranges for limiting cases of blast-wave behavior. We demonstrate that, for megaton yields, every translational casualty range varies as the cube root of the yield and thus corresponds to a constant value of peak overpressure. We further demonstrate that blast casualty criteria are currently known with more than sufficient accuracy and that, by far, the greatest uncertainty concerns the blast environment within structures. Consequently, for predicting blast casualties, the major problem area lies in mechanics not biology. We further analyze and characterize the structure of casualty prediction problems and show, for example, that, for any exposure environment, the range distribution of casualties is tightly clustered around the median value. We describe explicitly the general procedure for synthesizing total casualty predictions from the results of specialized problems. (Author)
AD-668 342 HC$3.00 MF$0.65

7. CHEMISTRY

7A. Chemical Engineering

PYROLYTIC DECOMPOSITION STUDIES OF TETRAETHOXYSILANE FOR OBTAINING HIGH-GRADE SiO2 FILMS.
Research and development technical rept.,
Army Electronics Command Fort Monmouth N J
George W. Heunisch. Dec 67, 24p Rept no. ECOM-2918

Descriptors: (*Silicon dioxide, Films), (*Silanes, Pyrolysis), Electric insulation, Deposition, Vapors, Ethers, Liquids, Polymerization, Integrated circuits.
Identifiers: *Chemical vapor deposition, Tetraethoxysilanes.

Silicon oxide can be produced by decomposition of alkoxy silane compounds, and, under certain conditions, thin films of silicon oxide can be deposited over metal substrates. Tetraethoxysilane was chosen for study because of its high oxygen content, making possible clear, thick films (1-3) and the low temperature needed for decomposition. An investigation was made of several means of decomposition. One of these - bulk liquid and liquid solutions - proved unsuitable for producing the desired films. Liquid phase reactions tend to produce polymers or amorphous solids and include incompletely reacted material with the deposit. Gas phase decompositions, on the other hand, produce hard, insulating films. A flowing system similar to that used by the electronics industry was evaluated and compared with a new closed tube system, which has been designed and fabricated to help overcome difficulties encountered with the flowing system. With the closed tube, films can be conveniently deposited on varied substrates, thus providing unique environments for the study of their chemical and electrical properties. (Author)
AD-667 897 HC$3.00 MF$0.65

RESEARCH IN MATERIALS SCIENCE AND ENGINEERING.
Massachusetts Inst of Tech Cambridge
For primary bibliographic entry see Field 11G.
AD-668 215 HC$3.00 MF$0.65

ORVAC-TF A FORTRAN CODE FOR THE CALCULATION OF A DESALINATION PLANT INCORPORATING A VAPOR COMPRESSOR SYSTEM TOPPING AN MSF PLANT,
Oak Ridge National Lab., Tenn.
R. O. Friedrich. Jan 68, 189p

Descriptors: (*Desalination, *Computer programs), Water supplies, Industrial plants.
Identifiers: FORTRAN.

For abstract, see NSA 22 08.
ORNL-TM-2006 HC$3.00 MF$0.65

UNIT OPERATIONS SECTION QUARTERLY PROGRESS REPORT, JANUARY-MARCH 1967.
Oak Ridge National Lab., Tenn.
Feb 68, 74p
Contract W-7405-eng-26

Descriptors: (*Radiochemistry, Chemical engineering), (*Chemical engineering, Reviews), Reactor materials, Processing, Ribonucleic acids, Separation.

For abstract, see NSA 22 08.
ORNL-4139 HC$3.00 MF$0.65

THIRD VIRIAL COEFFICIENTS OF NONPOLAR GASES AND THEIR MIXTURES,
National Bureau of Standards, Boulder, Colo., Inst. for Materials Research.
For primary bibliographic entry see Field 20M.
PB-177 834 HC$3.00 MF$0.65

TRANSPORT PROPERTIES OF CRYOGENIC LIQUIDS AND THEIR MIXTURES,
National Bureau of Standards, Boulder, Colo. Cryogenics Div.
For primary bibliographic entry see Field 20M.
PB-177 836 HC$3.00 MF$0.65

LEATHER CHEMISTRY FOR FOREMEN. FIRST YEAR COURSE.
Agency for International Development, Washington, D. C. Communications Resources Div.
For primary bibliographic entry see Field 11G.
PB-177 972 HC$3.00 MF$0.65

LEATHER CHEMISTRY FOR FOREMEN. SECOND YEAR COURSE,
Agency for International Development, Washington, D. C. Communications Resources Div.
For primary bibliographic entry see Field
PB-177 973 HC$3.00 MF$0.65

LEATHER CHEMISTRY FOR FOREMEN. THIRD YEAR COURSE,
Agency for International Development, Washington, D. C. Communications Resources Div.
For primary bibliographic entry see Field 11G.
PB-177 974 HC$3.00 MF$0.65

7B. Inorganic Chemistry

CONTINUOUS POTABLE WATER SUPPLY FOR FALLOUT SHELTERS AND OTHER ISOLATED SITES.
Northwestern Univ., Evanston, Ill. Technological Inst.
For primary bibliographic entry see Field 13B.
AD-450 653 HC$3.00

CUPROUS CHLORIDE IN HYDROCHLORIC ACID: ANALYSIS AND SOLUBILITY.
Physical sciences research papers no. 352,
Air Force Cambridge Research Labs L G Hanscom Field Mass
J. J. O'Connor, A. Thomasian, and A. F. Armington. Feb 68, 11p Rept no. AFCRL-68-0089

Descriptors: (*Copper compounds, Solutions), Chlorides, Gels, Complex compounds, Hydrochloric acid, Concentration (Chemistry), pH, Volumetric analysis, Solubility.
Identifiers: Cuprous chloride.

A new method of analysis for cuprous and hydrogen ion concentration gives rapid results, with no interference between ions. A solubility curve for cuprous chloride as a function of hydrochloric acid concentration was worked out. (Author)
AD-668 093 HC$3.00 MF$0.65

NMR SPECTRA OF DIPHOSPHORUS TETRAFLUORIDE,
Rohm and Haas Co Huntsville Ala Redstone Research Labs
For primary bibliographic entry see Field 7D.
AD-668 299 Not available from CFSTI.

PHYSIOCHEMICAL MEASUREMENTS OF METAL CHELATES BY GAS-LIQUID PARTITION CHROMATOGRAPHY.
Revised ed.,
Aerospace Research Labs Wright-Patterson AFB Ohio
Dennis R. Gere, and Ross W. Moshier. 5 Jun 67, 10p Rept no. ARL-68-0034
Revision of Report dated 8 Dec 66. Presented in part at the American Chemical Society National Meeting (152nd), Analytical Division, Sep 1966.
Availability: Published in Journal of Gas Chromatography, v6 p89-94 Feb 68.

Descriptors: (*Ytterbium compounds, Chelate compounds), (*Chelate compounds, *Gas chromatography), Thermal properties, Solvent extraction, Solutions, Interactions, Free energy, Enthalpy, Entropy.
Identifiers: Tetramethylheptane dionato ytterbium.

The understanding of not only the retention behavior, but also of the solute-solvent interactions in the liquid state can be made clearer by separation of the gas chromatography data into the basic thermodynamic quantities. A representative metal chelate, tris (2,2,6,6-tetramethylheptanedionato)-ytterbium (III), was partitioned in the liquid phases Apiezon L and QF-1. From the retention data as a function of temperature, pertinent thermodynamic values were calculated. It was discovered that the solutions differed sufficiently from ideality so that retention volumes cannot be predicted from saturation vapor pressure data alone. It was also shown that the degree of ideality changed with temperature and that the two liquid phases exhibited significantly different idealities. This consideration is important in the gas chromatography of metal chelates. As a comparison, the solute anthracene was studied under similar conditions. Elution of both solutes was somewhat unusual if it is realized that at some points the column temperature was as much as 50C below the melting point of the solute. This study was undertaken to determine the feasibility of obtaining solution thermodynamic values of metal chelates by gas chromatography. (Author)
AD-668 367 Not available from CFSTI.

RESEARCH ACTIVITIES IN THE FIELD OF MATERIALS SCIENCE.
North Carolina Univ Chapel Hill Materials Research Center
For primary bibliographic entry see Field 11G.
AD-668 501 HC$3.00 MF$0.65

VERSATILE SPECTROPHOTOMETRIC METHOD FOR THE DETERMINATION OF MICROGRAM AMOUNTS OF MERCURY,
Idaho Nuclear Corp., Idaho Falls.
F. Fullerton, and S. S. Yamamura. Jan 68, 22p
Contract AT (10-1)-1230

Descriptors: (*Mercury, Microanalysis), Spectroscopy, Complex compounds, Absorption spectrum.

For abstract, see NSA 22 08.
IN-1159 HC$3.00 MF$0.65

HYDRATED CALCIUM PEROXIDES.
Sur les Peroxydes de Calcium Hydrates
National Aeronautics and Space Administration, Washington, D. C.
D. Forcrand. Mar 68, 4p NASA-TT-F-11620
Tran- Transl. Into English From Compt. Rend. Acad. Sci. (Paris), V. 80, No. 20, 1900 P 1308-1311

Descriptors: *Calcium oxides, *Chemical analysis, *Hydration, *Inorganic peroxides, Characterization, Chemical reactions, Precipitation (chemistry).

For abstract, see STAR 06 10.
N68-19748 HC$3.00 MF$0.65

7C. Organic Chemistry

ABSOLUTE RATE CONSTANTS FOR HYDROCARBON OXIDATION. VIII. THE REACTIONS OF CUMYLPEROXY RADICALS,
National Research Council of Canada Ottawa (Ontario) Div of Applied Chemistry
For primary bibliographic entry see Field 7D.
AD-668 036 Not available from CFSTI.

CARBODIHYDRAZONES AND OXALYL DIHYDRAZONES.
National Research Council of Canada Ottawa (Ontario) Div of Applied Chemistry
D. M. Wiles, and T. Suprunchuk. 13 Sep 67, 6p
NRC-9907
Availability: Published in Canadian Journal of Chemistry, v46 p701 1968.

Descriptors: (*Hydrazones, Synthesis (Chemistry)), Hydrazine derivatives, Aldehydes, Ketones, Molecular structure, Spectra (Infrared), Canada.
Identifiers: Carbodihydrazones, Oxalyl dihydrozones.

Carbodihydrazones and oxalyl dihydrazones were prepared using the reaction between aldehydes and carbohydrazide and oxalyl dihydrazide, respectively. The structures of these new series of compounds were established by comparing their infrared absorption spectra with those of related compounds. The potential scope of the synthetic method was indicated by the preparation of analogous derivatives from two aromatic aldehydes and from two simple ketones. (Author)
AD-668 037 Not available from CFSTI.

SYNTHESIS OF ALPHA-MERCAPTOACETAMIDINIUM CHLORIDES VIA THE CORRESPONDING PHOSPHOROTHIOATES,
Illinois Univ Chicago
For primary bibliographic entry see Field 6P.
AD-668 039 Not available from CFSTI.

NEW IRON-CONTAINING MONOMERS AND POLYMERS FROM FIVE-MEMBERED NAPHTHENES,
Foreign Technology Div Wright-Patterson AFB Ohio
Ya. M. Paushkin, T. P. Vishnyakova, T. A. Sokolinskaya, I. I. Patalakh, and F. F. Machus. 29 Aug 67, 17p Rept no. FTD-HT-67-171
Edited trans. of Institut Neftekhmicheskoi i Gazovoi Promyshlennosti, Moscow. Trudy (USSR) n44 p15-26 1963, tr. by H. Peck.

Descriptors: (*Ferrocenes, Alkylation), (*Polymers, Ferrocenes), Metalorganic compounds, Physical properties, Chemical properties, Polymerization, Condensation reactions, Paramagnetic resonance, Molecular orbitals, Molecular structure, Spectra (Infrared).
Identifiers: *Metalorganic polymers, Translations.

The alkylation of ferrocene by different olefins (iso- C4H8, iso-C5H10, and iso-C8H16) in the presence of 25% H3PO4 is described. BF3 at the optimum conditions of 60C and a 5-hr. agitation period, is compared. With an increase in olefin molecular weight, there is a decrease in alkylate yield and ferrocene conversion accompanied by an increase of monoalkylferrocene content. The physical-chemical properties of the prepared alkylferrocenes are listed. Ferrocene and alkylferrocene were then used to obtain ferrocenyl-containing polymers by the polyrecombination reaction which consists of peroxide treatment at 170-200C. The joint polyrecombination of ferrocene with paradichlorobenzene, diphenol, alpha-bromonaphthalene and quinoline was also investigated and the data are tabulated. Soluble polymers were obtained by the polycondensation of ferrocene with acetone in the presence of ZnCl2 + HCl. The preparation of polyferrocenylvinylene from acetylferrocene is described. (Author)
AD-668 062 HC$3.00 MF$0.65

AN ANALYSIS OF THE COMBINATION SCATTERING SPECTRUM OF DIMETHYL BENZENE,
Foreign Technology Div Wright-Patterson AFB Ohio
Wen-pai Liu, Pao-zen Chang, and Yu-chuen Wang. 3 May 67, 15p Rept no. FTD-HT-66-800
Edited trans. of Hua Hsueh T'ung Pao (Chinese People's Republic) n1 p30-4 1966.

Descriptors: (*Xylenes, *Raman spectroscopy), Spectrometers, Mercury lamps, Hydrocarbons, Fluorescence, Band spectrum, China.

Quantitative analysis of Raman spectra is based on the principle that a compound's content is proportional to its spectral intensity, which is also closely related to the equipment used and to operating conditions. A Hilger E-612 spectrograph with an FL-1 type low voltage mercury lamp as the light source was used to study those factors affecting the intensity of Raman spectra and the suitable operating conditions for this equipment. Intensities of Raman spectra of some hydrocarbons thus collected were found to agree with the reported data. Intensity of Raman spectra was determined by comparing it with that of fluorescence spectra of the standard substance. The Raman spectra were taken by exciting the strongest mercury line of 4358 angstrom and a saturated aqueous solution of sodium nitrite was used as the light filtering liquid. The fluorescence spectra utilized excitation of the mercury line of 3650 angstroms of quinine sulfate fluorescence and a solution of 1 mole of cupric nitrate and 2.5 moles of ethylene diamine was used as the light filtering liquid. Quantitative analysis of optical mixtures, mixtures of

known composition, and xylene produced as a by-product by a steel mill was satisfactorily conducted. Hydrocarbons of low aliphatic content may directly undergo Raman spectral analysis with good results without chromatographic fractionation. (Author)
AD-668 097 HC$3.00 MF$0.65

RATE CONSTANTS FOR THE SELF-REACTIONS OF n- AND sec-BUTYLPEROXY RADICALS AND CYCLOHEXYLPEROXY RADICALS. THE DEUTERIUM ISOTOPE EFFECT IN THE TERMINATION OF SECONDARY PEROXY RADICALS,
National Research Council of Canada Ottawa (Ontario) Div of Applied Chemistry
For primary bibliographic entry see Field 7D.
AD-668 197 Not available from CFSTI.

ON THE DETERMINATION OF MOLECULAR WEIGHTS OF POLYPROPYLENE GLYCOLS AND POLYETHYLENE GLYCOLS BY HYDROXYL ENDGROUP ANALYSIS,
Laval Univ Quebec Departement de Genie Chimique
L. P. Blanchard, and M. D. Baijal. 18 Jul 66, 5p
Research supported in part by National Research Council of Canada.
Availability: Published in Polymer Letters, v4 p837-41 1966.

Descriptors: (*Glycols, Polymers), (*Polymers, Quantitative analysis), Propenes, Alcohols, Butanols, Molecular weight, Esters, Tables, Canada.
Identifiers: Butane diols, Polyethylene glycols, Polypropylene glycols, Esterification.

Quantitative chemical detection of identifiable endgroups in molecules is a method often used to determine number-average molecular weights (Mn) of polymers. Conventional chemical analysis (I) of endgroups, such as hydroxyls (OH), by an esterification reaction, yields results which are adequately accurate up to Mn < or = 25,000. It is necessary to determine experimentally the maximum permissible weight of a sample that can be used in an 'OH' determination in order to obtain true molecular weights. To do this one has to establish the relationship which exists between the molecular weight and the weight of sample analyzed. This was done using several polyglycols (PPG-200, -750, -1025 and PEG-200, -600) and 1,4-butanediol. The results reported establish the above-mentioned relationship, and clearly indicate the excess esterifying reagent needed to obtain true values of Mn (OH) for polymers having Mn < or = 2025.
AD-668 265 Not available from CFSTI.

A NON-STEREOCHEMICAL APPROACH TO SILICON-NITROGEN PI-BONDING,
Alberta Univ Edmonton Dept of Chemistry
For primary bibliographic entry see Field 7D.
AD-668 266 Not available from CFSTI.

KINETIC ASPECTS OF THE COPOLYMERIZATION OF TETRAHYDROFURAN WITH PROPYLENE OXIDE. I.
Laval Univ Quebec Departement de Genie Chimique
For primary bibliographic entry see Field 7D.
AD-668 267 Not available from CFSTI.

ELECTROPHILIC REACTIONS OF HEXAFLUOROACETONE,
University of Western Ontario London Dept of Chemistry
A. F. Janzen, P. F. Rodesiler, and C. J. Willis. 15 Aug 66, 3p
Availability: Published in Chemical Communications, p672 1966.

Descriptors: (*Acetones, Chemical reactions), Halogenated hydrocarbons, Fluorine compounds, Siloxanes, Synthesis (Chemistry), Canada.
Identifiers: Hexafluoro acetones, Electrophylic reactions.

It was found that 1,2-bis(trimethylsiloxy)tetrakis (trifluoromethyl)ethane is produced by the reaction of hexafluoroacetone with bis (trimethylsilyl)-mercury. (Me3Si)2Hg. It is suggested the extremely electrophilic nature of hexafluoroacetone, associated with the presence of two trifluoromethyl groups, may be a dominant feature of the chemistry of this reactive compound.
AD-668 271 Not available from CFSTI.

THE PREPARATION OF FLUORODINITRO ACETONITRILE AND FLUORODINITRO ACETAMIDE,
Rohm and Haas Co Huntsville Ala Redstone Research Labs
R. A. Wiesboeck, and John K. Ruff. 1968, 1p
Contract DA-01-021-ORD-11878(Z)
Availability: Published in Journal of Organic Chemistry v33 p1257 1968.

Descriptors: (*Fluorine compounds, Synthesis (Chemistry)), (*Acetonitriles, Fluorination), (*Acetamides, Synthesis (Chemistry)), Halogenated hydrocarbons, Organic nitrogen compounds, Hydrolysis, Spectra (Infrared).
Identifiers: Fluorodinitro acetamides, Fluorodinitro acetonitrile.

Aqueous fluorination of sodium dinitroacetonitrile produced fluorodinitroacetonitrile in moderate yield: NaC (NO2)2CN + F2 to FC (NO2)2CN + NaF. Fluorodinitroacetamide was obtained in quantitative yield by adding the stoichiometric amount of water to a HCl-saturated ether solution of fluorodinitroacetonitrile: FC(NO2)2CN + H2O to FC(NO2)2CONH2.
AD-668 298 Not available from CFSTI.

POLYNITRO ALIPHATIC SYNTHESIS.
Final rept. 16 Sep 57-31 Dec 64,
Ohio State Univ Research Foundation Columbus
Harold Shechter. Mar 68, 27p
Contract Nonr-495 (14)
Continuation of contract N6onr-225 (24).

Descriptors: (*Organic nitrogen compounds, Synthesis (Chemistry)), Organic phosphorus compounds, Ethers, Molecular structure, Spectra (Visible + ultraviolet), Spectra (Infrared), Cyclopropanes.
Identifiers: Nitro cyclopropanes, Phosphoranes.

Carbomethoxymethylene triphenylphosphorane and conjugated nitroolefins react with subsequent proton-transfer to give phosphorus ylides, carbomethoxynitro alkylidene triphenylphosphoranes (I). The structures of I were established from their infrared and ultraviolet absorptions. Chemical evidence for the structure of a typical phosphorane was obtained by its bromination and subsequent regeneration by aqueous sodium carbonate. Methylene triphenylphosphorane and dimethylsulfoxonium methylide (II) react with conjugated nitroolefins to yield nitrocyclopropanes; II is the much more efficient and convenient reagent. The spectral properties of various nitrocyclopropanes are described. (Author)
AD-668 343 HC$3.00 MF$0.65

IONIC REACTIONS OF UNSATURATED COMPOUNDS. I. POLYMERIZATION OF ACETYLENE,
Aerospace Research Labs Wright-Patterson AFB Ohio
For primary bibliographic entry see Field 7D.
AD-668 369 Not available from CFSTI.

INFRARED AND RAMAN VIBRATIONAL STUDY OF ETHYLBENZENE, n-PROPYLBENZENE AND TERMINAL HALOGEN-SUBSTITUTED ANALOGS, 800-50/cm.
Summary technical rept. Oct 66-Aug 67,
Dayton Univ Ohio
James E. Saunders. Mar 68, 86p
AFML-TR-67-292
Contract AF 33 (657)-8553

Descriptors: (*Benzenes, *Infrared spectroscopy), *Raman spectroscopy, Benzenes), (*Halogenated hydrocarbons, Infrared spectroscopy), Molecular isomerism, Chlorine compounds, Bromine compounds, Iodine compounds, Band spectrum, Stereochemistry.
Identifiers: Ethyl benzenes, Propyl benzenes, Molecular conformations.

The infrared and Raman spectra of C6H5-(CH2)n-X, where X = H, Cl, Br, I when n = 2 and X = H, Cl, Br when n = 3, were studied in the liquid state from 800-50/cm. An attempt was made to assign the vibrations of the monosubstituted benzene ring, the far infrared deformational vibrations, and the structure-dependent halogen stretching vibrations. In the (2-haloethyl)-benzenes, two bands are assigned to the carbon-halogen vibrations, one for each isomeric form and it is concluded that the trans conformer is more stable than the gauche. In the (3-halo-propyl)-benzenes, three bands are assigned to the carbon-halogen vibrations. The identity of these conformations is discussed using the nomenclature of Shimanouchi and Mizushima. Low temperature spectra were obtained in the 800-400/cm region in the infrared and depolarization ratios were measured in the Raman bands. It was found necessary to revise the previous vibrational assignments of ethylbenzene and propose an assignment for n-propylbenzene in the region below 800/cm. (Author)
AD-668 478 HC$3.00 MF$0.65

RESEARCH ACTIVITIES IN THE FIELD OF MATERIALS SCIENCE.
North Carolina Univ Chapel Hill Materials Research Center
For primary bibliographic entry see Field 11G.
AD-668 501 HC$3.00 MF$0.65

ORGANIC ACID DIHALOGENIDES OF THIOPHOSPHONIC AND THIOPHOSPHORIC ACIDS,
Joint Publications Research Service, Washington, D. C.
V. P. Evdakov, V. N. Aleksandrov, N. Ya. Skulskaya, and N. N. Melnikov. 20 Feb 68, 25p
Trans. of Zhurnal Obshchei Khimii (USSR) v37 n12 p2701-6, 2714-5, 2724-6, 2760-3 1967.

Descriptors: (*Organic phosphorus compounds, Synthesis (Chemistry)), Sulfur compounds, Phosphonic acids, Phosphoric acids, Anhydrides, Fluorides, Amides, Ethers, Chlorides, Esters, Insecticides, Fungicides.
Identifiers: Thiophosphonic acids, Thiophosphoric acids.

Contents: Research on amides and anhydrides of phosphorus acids (XVI, Synthesis and certain conversions of alkyl- and arylmonothiophosphonic acid anhydrides); Preparation of methylthiophosphonic acid difluoride; N-aryl (alkyl)-N'-ethylenefluorodiamides of thiophosphoric acid; Organic insectofungicides (CXIV, Acid chlorides and aryl esters of n-carbalkoxyalkylamidomethylthiophonic acid).
JPRS-44431 HC$3.00 MF$0.65

INVESTIGATION OF HYDROGEN CHLORIDE ALPHA ELIMINATION IN CHLOROAMINES.
Untersuchungen Zur Basischen Alpha Eliminierung Von Hydrogenchlorid Aus Chloraminen
Technische Hochschule Munchen (West Germany).
J. Fischer. 1967, 118p
Lang- in German

Descriptors: *Amines, *Hydrochloric acid, *Imines, *Solvent extraction, Ammonia, Bases (chemical), Bibliographies, Carbon, Chemical reactions, Nitrogen.

For abstract, see STAR 06 10.
N68-19591 HC$3.00 MF$0.65

7D. Physical Chemistry

DETERMINATION OF PRINCIPAL REACTIONS IN 4:1 MIXTURES OF N2 AND O2 DURING AND AFTER PULSED IONIZATION,
Ballistic Research Labs Aberdeen Proving Ground Md
Franklin E. Niles. Dec 67, 67p Rept no. BRL-1387

Descriptors: (*Gas ionization, Chemical reactions), (*Oxygen, Chemical reactions), (*Nitrogen, Chemical reactions), Afterglows, Electrons, Nitrogen oxides, Ions, Reaction kinetics, Differential equations, Numerical analysis, Air, Computer programs.

Computer solutions were obtained for 15 simultaneous differential equations which describe the time rate of change of electrons, NO2 (-), O (-), O2 (-), O3 (-), N2 (+), NO (+), O (+), O2 (+), N, NO, N2O, NO2, O, and O3 during and after pulsed ionization. The calculations were made for a 4:1 mixture of N2 and O2 at a total pressure of 5 Torr. Ionization was repetitive at a rate of 8.05 x 10 to the 9th power ion pairs/cu cm/sec for about a half second and zero for about a half second. The number densities at the end of the sixth pulse of ionization were used as initial number densities for calculations in which ionization was not applied. These calculations yield the afterglow solutions. The afterglow solutions reveal that (1) NO (+) is the only important positive ion throughout the afterglow period, (2) the most important negative ion changes progressively with time from O2 (-) to O3 (-) to NO2 (-), and (3) other than N2 and O2, NO is the most important neutral species throughout the afterglow with NO2 and N2O being the only other neutrals remaining in the very late afterglow. The interconnection of the ions and neutrals via reactions during the early afterglow is shown by a schematic diagram. (Author)
AD-667 961 HC$3.00 MF$0.65

STABILITY OF LYOPHOBIC COLLOIDS IN AQUEOUS MEDIA.
Army Weapons Command Rock Island Ill Research and Engineering Div
For primary bibliographic entry see Field 11K.
AD-667 971 HC$3.00 MF$0.65

ENVIRONMENTAL EFFECTS ON PHOSPHORESCENCE. II. 'ACTIVATION VOLUMES' FOR TRIPLET DECAY OF AROMATIC HYDROCARBONS.
California Univ Santa Barbara Dept of Chemistry
For primary bibliographic entry see Field 7E.
AD-667 975 Not available from CFSTI.

FLUORESCENCE LIFETIME OF DIPHENYLMETHYLENE.
San Diego State Coll Calif Dept of Chemistry
For primary bibliographic entry see Field 7E.
AD-667 992 Not available from CFSTI.

THERMODYNAMIC PROPERTIES OF BINARY MIXTURES OF n-ALKANES,
Stanford Univ Calif Dept of Chemistry
Robert A. Orwoll, and Paul J. Flory. 1 Aug 67, 10p
AFOSR-68-0717
Contract AF 49 (638)-1341
Availability: Published in Journal of the American Chemical Society, v89 n26 p822-9 Dec 20 1967.

Descriptors: (*Alkanes, Thermodynamics), (*Polymers, Thermodynamics), Thermochemistry, Statistical mechanics, Equations of state, Thermal expansion, Molecular association, Mixtures, Compressive properties, Enthalpy, Molecular weight, Molecular structure, Interactions, Transition temperature, Free energy.

The excess thermodynamic properties of mixtures of normal paraffin hydrocarbons are interpreted according to statistical mechanical theory developed earlier. Effects of intrinsic properties of the components, ignored in conventional treatments of solutions, are large for these systems. A single arbitrary parameter, reflected the differences of the interactions involving terminal (methyl) as compared to internal (methylene) groups, suffices to reproduce the excess volumes, excess thermal expansion coefficients, excess compressibilities, and excess enthalpies for all mixtures of normal paraffins, CnH2n+2, n>5, for which data are available. The decrease in excess enthalpy with temperature and the reversal of its sing at elevated temperatures, observed for several systems, are predicted, but the magnitude of the change with temperature is underestimated. Precise agreement of calculated excess chemical potentials with those observed for the several systems investigated experimentally is achieved through introduction of an additional parameter to represent the entropy associated with interactions between terminal and midchain groups; the same value is assigned to this parameter for all systems and temperatures. The theoretical equations, in conjunction with the equation-of-state information and the two parameters cited, correctly predict the occurrence of lower critical mixcibility for solutions of polymethylene in the n-alkanes. Calculated critical temperatures approximate those found by experiment for n-C6H14, n-C7H16, and n-C8H18. (Author)
AD-668 004 Not available from CFSTI.

ABSOLUTE RATE CONSTANTS FOR HYDROCARBON OXIDATION. VIII. THE REACTIONS OF CUMYLPEROXY RADICALS,
National Research Council of Canada Ottawa (Ontario) Div of Applied Chemistry
J. A. Howard, K. U. Ingold, and M. Symonds. 27 Oct 67, 7p
NRC-9913
Availability: Published in Canadian Journal of Chemistry, v46 p1017-22 1968.

Descriptors: (*Hydrocarbons, Oxidation), (*Free radicals, Reaction kinetics), Benzenes, Peroxides, Tracer studies, Deuterated compounds, Canada.
Identifiers: Cumenes.

Absolute rate constants were measured for the reactions of cumylperoxy radicals with a number of hydrocarbons. The cumylperoxy radicals were produced from cumene hydroperoxide. Sufficient hydroperoxide was present to ensure that only cumylperoxy radicals were involved in the rate-determining propagation reaction. Primary and secondary deuterium isotope effects were measured for propagation and termination in the oxidation of cumene. The rate of hydrogen atom abstraction from ring-substituted cumenes by cumylperoxy radicals can be correlated by the Hammett equation using sigma (+) substituent constants, Rho = -0.29. Primary and secondary peroxy radicals are about 3-5 times more reactive in hydrogen abstraction than tertiary peroxy radicals. (Author)
AD-668 036 Not available from CFSTI.

DIELECTRIC RELAXATION AND ORIENTATIONAL ORDERING OF WATER MOLECULES IN HEXAMETHYLENETETRAMINE HEXAHYDRATE,
National Research Council of Canada Ottawa (Ontario) Div of Applied Chemistry
D. W. Davidson. 19 Sep 67, 5p
NRC-9894
Availability: Published in Canadian Journal of Chemistry, v46 p1024-7 1968.

Descriptors: (*Amines, Dielectric properties), (*Hydrates, *Molecular association), Molecular structure, Crystal structure, Chemical bonds, Nuclear magnetic resonance, Water, Canada.
Identifiers: *Hexamethylene tetramine.

To account for the dielectric properties of hexamethylenetetramine hydrate, which include a static dielectric constant half that of ice, some modification is necessary of the partial orientational ordering of the water molecules proposed by Mak. It is suggested that water hydrogen atoms occupy fixed positions only in the hydrogen bonds with nitrogen. (Author)
AD-668 038 Not available from CFSTI.

CONJECTURE CONCERNING AN ASYMPTOTIC MODIFICATION OF THE YVON-BORN-GREEN EQUATION FOR FLUIDS OF RIGID SPHERES AND DISKS,
Chicago Univ Ill James Franck Inst
David A. Young, and Stuart A. Rice. 1967, 9p
AFOSR-68-0785
Grant AF-AFOSR-781A-67
Availability: Published in Journal of Chemical Physics, v47 n12 p5061-7 Dec 15 1967.

Descriptors: (*Phase studies, *Integral equations), Distribution functions, Liquids, Solids, Statistical mechanics, Spheres, Disks, Molecular association.
Identifiers: *Yvon-Born-Green equation.

An asymptotic (long-range) modification of the Yvon-Born-Green equation for rigid spheres and disks is made which extends the validity of the equation to pressures above the Kirkwood limit. Modification of the YBG equation with both short-range and long-range terms yields equations of state in good agreement with molecular dynamics experiments up to the fluid-solid phase transitions. The application of this technique to fluids with attractive potentials and to other integral equations is briefly discussed. (Author)
AD-668 044 Not available from CFSTI.

CUPROUS CHLORIDE IN HYDROCHLORIC ACID: ANALYSIS AND SOLUBILITY.
Air Force Cambridge Research Labs L G Hanscom Field Mass
For primary bibliographic entry see Field 7B.
AD-668 093 HC$3.00 MF$0.65

AN ANALYSIS OF THE COMBINATION SCATTERING SPECTRUM OF DIMETHYL BENZENE,
Foreign Technology Div Wright-Patterson AFB Ohio
For primary bibliographic entry see Field 7C.
AD-668 097 HC$3.00 MF$0.65

SPECTRAL SHIFTS AND BROADENING OF THE FLUORESCENCE OF ANTHRACENE AND TETRACENE IN SEVERAL HOST CRYSTALS AT HIGH PRESSURES.
Rept. for Mar 66-Mar 67,
Aerospace Corp El Segundo Calif
Peter F. Jones. 29 Feb 68, 42p Rept no. TR-0158 (9250-01)-2
SAMSO-TR-68-150
Contract F04695-67-C-0158

Descriptors: (*Polycyclic compounds, *Fluorescence), Anthracenes, Solid solutions, Emissivity, Band spectrum, Electron transitions, Excitons, Molecular isomerism, Perturbation theory, Naphthalenes, Phenanthrenes.
Identifiers: Biphenyls, Naphthacenes, Terphenyls, Excimers.

The fluorescence spectra of anthracene in biphenyl, p-terphenyl, naphthalene, and phenanthrene and those of tetracene in p-terphenyl, naphthalene, phenanthrene, and anthracene were measured at pressures as great as 50 kbar. Contrary to the unexpected behavior found in the spectra of the pure hosts, the pressure effects on the spectra of the guests are generally analogous to the pressure effects in solution or the gas phase. Due to the increased dispersion interaction between these nonpolar molecules upon compression, the energies of the electronic transitions are shifted toward the red (lower energy) and the spectral bands are broadened, while the integrated intensity remains approximately constant. As the pressure is released, the fluorescence spectra return to those

obtained before compression. The spectral shifts with pressure are satisfactorily interpreted in terms of a second-order perturbation theory using a dipole - dipole approximation. For three of the eight guest - host combinations, the fluorescence spectra above 35 kbar were considerably broader than expected. The similar broadening observed for the pure host crystals suggests that mixed excimers are produced at high pressures. On the basis of the present data, however, it is not possible to give an unambiguous explanation of the extensive broadening. (Author)
AD-668 111 HC$3.00 MF$0.65

HYDROGEN DOPING AND PARAMAGNETIC PROPERTIES OF IONIC CRYSTALS AT HIGH TEMPERATURES,
Rome Air Development Center Griffiss AFB N Y
For primary bibliographic entry see Field 20L.
AD-668 122 HC$3.00 MF$0.65

INVESTIGATION OF THE ENERGY SPECTRA OF ATOMS SPUTTERED FROM A TUNGSTEN SINGLE CRYSTAL BY MERCURY IONS,
Foreign Technology Div Wright-Patterson AFB Ohio
For primary bibliographic entry see Field 20B.
AD-668 157 HC$3.00 MF$0.65

ELECTROCHEMICAL CORROSION STUDIES OF GALVANICALLY COUPLED SNAP-21 MATERIALS,
Naval Radiological Defense Lab San Francisco Calif
For primary bibliographic entry see Field 18N.
AD-668 161 HC$3.00 MF$0.65

RATE CONSTANTS FOR THE SELF-REACTIONS OF n- AND sec-BUTYLPEROXY RADICALS AND CYCLOHEXYLPEROXY RADICALS. THE DEUTERIUM ISOTOPE EFFECT IN THE TERMINATION OF SECONDARY PEROXY RADICALS,
National Research Council of Canada Ottawa (Ontario) Div of Applied Chemistry
J. A. Howard, and K. U. Ingold. 1968. 3p
NRC-9993
Availability: Published in Journal of the American Chemical Society, v90 n4 p1058 1968.

Descriptors: (*Peroxides, Free radicals), (*Free radicals, Reaction kinetics), Hydrocarbons, Oxidation, Deuterated compounds, Canada.

Rate constants for the self-reaction of saturated peroxy radicals derived from n- and sec-butyl hydroperoxide and cyclohexyl hydroperoxide were obtained by the rotating sector method using tetralin and alpha-methyl-styrene as the oxidation substrates. The rate constants of the saturated peroxy radicals are significantly smaller than for unsaturated radicals. Diphenylmethyl hydroperoxide and sec-butyl hydroperoxide (normal, or deuterated at the alpha position) were added to an oxidizable substrate. Under standard conditions, differences in the oxidation rates in the presence of normal and deuterio hydroperoxide reflect differences in the rate constant of termination since all the other rate constants will be identical. These results taken together with the fact that singlet oxygen is evolved in the self-reaction of sec-butylperoxy radicals provide evidence that the Russell mechanism plays an important role in the termination of oxidation chains involving secondary (and primary) peroxy radicals at room temperature.
AD-668 197 Not available from CFSTI.

RESEARCH IN MATERIALS SCIENCE AND ENGINEERING.
Massachusetts Inst of Tech Cambridge
For primary bibliographic entry see Field 11G.
AD-668 215 HC$3.00 MF$0.65

SLIT FUNCTION EFFECTS IN ATOMIC SPECTROSCOPY,
Florida Univ Gainesville Dept of Chemistry
L. De Galan, and J. D. Winefordner. Mar 68, 16p
AFOSR-68-0754
Grant AF-AFOSR-1033-67
Availability: Published in Spectrochimica Acta, v23B p277-89 1968.

Descriptors: (*Atomic spectroscopy, Distribution functions), Integrals, Line spectrum, Intensity, Spectrometers, Calibration, Emissivity.

Solutions of the convolution integral are presented to show the influence of triangular, Gaussian and Lorentzian slit functions on the spectral distribution of the irradiance and the radiant power in the measurement of Lorentzian and Gaussian shaped spectral lines. Expressions in the limit of narrow and wide slits are used to discuss: (1) the measurement of the total intensity of the total absorption of an atomic spectral line, (2) instrument calibration with a continuum light source, (3) the definition of the spectral bandwidth and (4) the advantage of using a peak integrating device in the photoelectric detection of atomic spectra. (Author)
AD-668 221 Not available from CFSTI.

THE INFLUENCE OF SUBSTRATE TEMPERATURE ON THE STICKING COEFFICIENT OF ZINC ON GLASS,
Goucher Coll Towson Md
Barton L. Houseman, and Barbara E. Marzocchi.
May 68, 27p
NDL-TR-106
Contracts AT (49-7)-2883, DA-18-035-AMC-94 (E)

Descriptors: (*Radioactive fallout, Simulation), (*Zinc, Vapor plating), Substrates, Glass, Temperature, Condensation, Surface properties, Molecular association, Films.
Identifiers: *Sticking coefficients.

The influence of glass substrate temperature between room temperature and 95C on the sticking coefficient of zinc-on-glass in a vacuum of 0.000001 torr was studied. The sticking coefficient was found to be significantly higher at 65 to 95C. At room temperature no adsorption of zinc was observed even after the glass surface was exposed to a high flux of zinc vapor atoms for 15 minutes. Contamination effects on the sticking coefficient are described; it was noted that at temperatures within the range of 65 to 95C a uniform and continuous film of zinc deposited on glass slides cleaned with nitric acid and water. The effect of change in the flux of the zinc vapor on the sticking coefficient is also discussed. Three theories are proposed to explain the phenomena of increased sticking of zinc with increased substrate temperature. (Author)
AD-668 252 HC$3.00 MF$0.65

RECOMBINATION OF Br ATOMS BY FLASH PHOTOLYSIS OVER A WIDE TEMPERATURE RANGE,
Toronto Univ (Ontario) Dept of Chemistry
J. K. K. Ip, and George Burns. 26 Jun 67, 13p
AFOSR-68-0790
Grant AF-AFOSR-506-64, Contract-AF-AFOSR-506-66
Availability: Published in Discussions of the Faraday Society, n44 p241-51 1967.

Descriptors: (*Bromine, *Recombination reactions), Photolysis, Reaction kinetics, Shock waves, Theory, Dissociation, Canada.

The recombination rate constant of Br atoms in argon was measued up to 1273K using a flash photolysis technique. At room temperature and up to 480K, results agree with the literature, but at 1150K the recombination rate constant is about one third of the rate constant predicted from shock-wave studies of Br2 dissociation. The discrepancy can be explained by considering a model for coupling of vibrational relaxation and dissociation. The main assumptions of the model are that the vibrational relaxation in dissociating gas at reasonably low temperatures can be described by a single relaxation time and that diatomic molecules dissociate from the uppermost vibrational levels. The model reconciles the shock wave and flash photolysis data. In this model, the reduced vibrational relaxation time for Br2 in argon at 1200K was taken to be equal to 0.95 microsec atm. An alternate model, which considers a coupling of electronic excitation and dissociation processes, is also discussed. (Author)
AD-668 261 Not available from CFSTI.

A NON-STEREOCHEMICAL APPROACH TO SILICON-NITROGEN PI-BONDING,
Alberta Univ Edmonton Dept of Chemistry
M. G. Hogben, A. J. Oliver, and W. A. G. Graham. 1967, 3p Rept no. Reprint-2871
Availability: Published in Chemical Communications, p1183-4 1967.

Descriptors: (*Amines, Chemical bonds), (*Silanes, *Chemical bonds), Halogenated hydrocarbons, Fluorine compounds, Molecular orbitals, Nuclear magnetic resonance, Canada.
Identifiers: *Silamines, Trimethylsilyl pentafluoroanilines.

The relationship between the ortho-para fluorine coupling constant and the chemical shift of the para-fluorine atom was examined in several pentafluoro aniline derivatives. The results, since they depend only on the electron distribution as experienced by the pentafluoro phenyl ring, provide a non-stereo-chemical approach to the re-examination of the concept of silicon-nitrogen pi-bonding.
AD-668 266 Not available from CFSTI.

KINETIC ASPECTS OF THE COPOLYMERIZATION OF TETRAHYDROFURAN WITH PROPYLENE OXIDE. I.
Revised ed.,
Laval Univ Quebec Departement de Genie Chimique
L. P. Blanchard, J. Singh, and M. D. Baijal. 11 Jul 66, 11p
Revision of report dated 14 Dec 64.
Availability: Published in Canadian Journal of Chemistry, v44 p2679-89 1966.

Descriptors: (*O-heterocyclic compounds, Copolymerization), (*Copolymerization, Reaction kinetics), Glycols, Polymers, Synthesis (Chemistry), Furans, Spectra (Infrared), Canada.
Identifiers: Tetrahydrofurans, Propylene oxides, Polyether diols.

Tetrahydrofuran and propylene oxide were copolymerized in the presence of the catalyst boron fluoride ethyl ether, and various co-catalysts, such as 1,2-propanediol, 1,3-propanediol, and 1,4-butanediol. Reactions were carried out at 0C and at atmospheric pressure. The homopolymerization of tetrahydrofuran did not take place, whereas that of propylene oxide proceeded at a rapid rate. In the copolymerization of tetrahydrofuran with propylene oxide, the rate of disappearance of tetrahydrofuran was found to be independent of its concentration, but varied directly with the concentration of propylene oxide. Under similar conditions, the rate of disappearance of propylene oxide was found to be (a) proportional to the square of its concentration, and (b) inversely proportional to the concentration of tetrahydrofuran. Reactivity ratios varied between 1.3 and 1.8 for propylene oxide and between 0.1 and 0.6 for tetrahydrofuran. Molecular weights obtained by vapor pressure osmometry ranged between 460 and 740, and those obtained by hydroxyl end-group analysis ranged between 520 and 1660. Infrared spectra confirmed the presence of hydroxyl groups and ether linkages in the copolymers prepared. Results on terminal unsaturation were negative. (Author)
AD-668 267 Not available from CFSTI.

DIELECTRIC LOSS IN CaF2 DOPED WITH OXYGEN IONS.
Technical rept.,
Utah Univ Salt Lake City Inst of Materials Research
Howard B. Johnson, G. R. Miller, and Ivan B. Cutler. Oct 67, 5p Rept no. IMR-68-012
Contract Nonr-1288 (06)
Availability: Published in Journal of the American Ceramic Society, v50 n0 p526-7 1967.

Descriptors: (*Molecular association, Calcium fluorides), (*Calcium fluorides, Dielectric properties), Oxygen, Single crystals, Dipole moments, Space charges, Diffusion, Surface properties, Ceramic materials, Electrical conductance, Theses.
Identifiers: Dissipation factor.

Dielectric loss was measured on CaF2 single crystals heated in air at 750 degrees C for 30 hr to introduce O2 (-) ions. The loss measurements were made in parallel and in perpendicular directions to the CaF2 surface region which contained most of the O2 (-). The layer containing O2 (-) was more conducting and therefore produced a space charge relaxation near 10 kcps at 210 degrees C. A similar loss peak was previously reported as due to oxygen ion-fluorine vacancy dipole relaxation. (Author)
AD-668 275 Not available from CFSTI.

EXCITED STATES AND RYDBERG SERIES IN THE EMISSION SPECTRUM OF NO,
Basel Univ (Switzerland) Inst of Physics
Martin Huber. 19 Dec 63, 21p
Grant AF-EOAR-61-19
Availability: Published in Helvetica Physica Acta, v37 fac4 p329-47 1964.

Descriptors: (*Nitrogen oxides, *Molecular spectroscopy), Molecular energy levels, Excitation, Electron transitions, Emissivity, Spectra (Visible + ultraviolet), Spectra (Infrared), Band spectrum, Tables, Intensity, Anomalies, Switzerland.

The emission spectrum of nitric oxide (NO) was photographed in the visible (5150 to 6900 A) and infrared (7625 to 11,000 A) regions, using the large dispersion of an 11 m grating spectrograph in the second (0.7 A/mm) and first (1.4 A/mm) order, respectively. The light source was an electric discharge through a rapidly streaming mixture of NO and A gas. Rotational analyses are given for a number of bands. Previous assignments are confirmed. Results are obtained for the delta-delta perturbation between the F and B' states. The constant p of lambda-type doubling in the B (2)Pi state is determined. Intensity anomalies occuring in bands in which H and H' states are involved are explained. An interpretation is suggested of previously unassigned bands as higher members of Rydberg series. (Author)
AD-668 282 Not available from CFSTI.

NMR SPECTRA OF DIPHOSPHORUS TETRAFLUORIDE,
Rohm and Haas Co Huntsville Ala Redstone Research Labs
F. A. Johnson, and R. W. Rudolph. 1967, 2p
Contract DA-01-021-AMC-11536 (Z)
Availability: Published in Journal of Chemical Physics, v47 n12 p5449-50 Dec 15 1967.

Descriptors: (*Fluorides, *Nuclear magnetic resonance), (*Phosphorus compounds, Nuclear magnetic resonance), Molecular spectroscopy, Molecular structure, Molecular isomerism.
Identifiers: Diphosphorus tetrafluoride.

The preparation of P2F4 (diphosphorus tetrafluoride) was recently reported (JACS v88 p3729, 3875 1966). The experimental 31P and 19F nuclear magnetic resonance spectra were given as part of the compound's characterization, but no detailed interpretation was attempted. It is the purpose of this note to complete the interpretation. (Author)
AD-668 299 Not available from CFSTI.

DOPPLER LINE SHAPE OF ATOMIC FLUORESCENCE OF SODIUM IODIDE,
Comision Nacional de Investigaciones Espaciales Buenos Aires (Argentina)
For primary bibliographic entry see Field 7E.
AD-668 305 Not available from CFSTI.

THE OXIDATION OF ALUMINUM FILMS IN LOW-PRESSURE OXYGEN ATMOSPHERES.
Journal article,
Massachusetts Inst of Tech Lexington Lincoln Lab
Charles T. Kirk, Jr., and E. E. Huber, Jr. 9 May 67, 30p Rept no. JA-3004
ESD-TR-68-34
Contract AF 19 (628)-5167
Availability: Published in Surface Science, v9 p217-45 1968.

Descriptors: (*Aluminum, *Oxidation), Oxygen, Reaction kinetics, Work functions, Metal films, Oxides, Heat of activation.
Identifiers: Oxide films, Surface chemistry.

The oxidation kinetics of aluminum films exposed to oxygen atmospheres at room temperature in the pressure range of from 10 -3 to 10 Torr are followed by simultaneous measurement of the film's oxygen uptake and work function as a function of time under the conditions of constant pressure. For successive increases in pressure, the experimental data for both the oxygen uptake and work function can be fitted to pressure-dependent, direct logarithmic time laws. On decreasing the oxygen pressure more or less abruptly to the vacuum level of the system, the total amount of oxygen taken up is observed to remain constant while the work function decays in accordance with a direct logarithmic time law. A theoretical treatment shows that the observed experimental behavior of both the oxygen uptake and work function of the oxidized aluminum film can be accounted for by a two-stage reaction. At the temperature and pressures employed in the experiment the first stage of the oxidation process is an activated oxygen chemisorption onto the oxidized surface of the film. The second stage is an activated, place-exchange process between the chemisorbed oxygen and the underlying aluminum atoms to form the oxide. An analysis of the experimental data in terms of the theory yields values for the aluminum-aluminum oxide-oxygen gas system parameters which are consistent with previously published results for this type of oxide film formation on aluminum. (Author)
AD-668 306 Not available from CFSTI.

PHYSICAL ADSORPTION--A TOOL IN THE STUDY OF THE FRONTIERS OF MATTER,
University of Southern California Los Angeles Dept of Chemistry
Arthur W. Adamson. Mar 68, 8p
AFOSR-68-0778
Grant AF-AFOSR-1097-66
Availability: Published in Journal Chemical Education, v44 n12 p710-6 Dec 1967.

Descriptors: (*Adsorption, Reviews), Thermochemistry, Surface area, Molecular association, Interfaces, Adhesion.

Physical adsorption studies provide an insight into how matter behaves at its frontiers. They can tell us the area of a surface, characterize its heterogeneity, plot the manner in which van der Waals attraction decays with distance, and now seem to be pointing the way to perhaps an even more important aspect, namely how matter is structurally distorted at an interface. All of these effects combine to provide an understanding of adhesion and contact angle phenomena. (Author)
AD-668 312 Not available from CFSTI.

AN EXPERIMENTAL STUDY OF THE BEHAVIOR OF LARGE NEGATIVE IONS.
Franklin GNO Corp West Palm Beach Fla
For primary bibliographic entry see Field 20I.
AD-668 339 HC$3.00 MF$0.65

ON THE PEOPLE AND THE PRACTICE OF ELECTROCHEMISTRY,
Defence Chemical Biological and Radiation Establishment Ottawa (Ontario)
E. J. Casey. Oct 67, 7p Rept no. DCBRE-535
Availability: Published in Chemistry in Canada, p3-8 ct 1967.

Descriptors: (*Electrochemistry, Canada), History, State-of-the-art reviews, Scientific personnel, Laboratories, Scientific research, Industrial research.

A review is given of the history and current status of electrochemical research and technology in Canada.
AD-668 357 Not available from CFSTI.

TUMBLING OF METHYL RADICALS ABSORBED ON A SILICA GEL SURFACE STUDIES BY ELECTRON SPIN RESONANCE,
Defence Chemical Biological and Radiation Establishment Ottawa (Ontario)
C. L. Gardner, and E. J. Casey. 12 Jun 67, 5p
Rept no. DCBRE-540
Presented at the Canadian Catalysis Symposium (2nd) Hamilton, Ontario, 12 Jun 67.
Availability: Published in Canadian Journal of Chemistry, v46 p207-10 1968.

Descriptors: (*Free radicals, *Electron spin resonance), Silica gel, Adsorption, Deuterated compounds, Hydrocarbons, Microwave spectroscopy, Relaxation time, Canada.
Identifiers: Methyl radicals.

The electron spin resonance spectra of CH3 and CD3 adsorbed on a silica gel surface at 77K are characterized by a marked dependence of the line width on nuclear spin quantum number. This dependence can be interpreted in terms of the tumbling of the radicals on the surface, anisotropies in the hyperfine and g tensors giving rise to a relaxation mechanism dependent on M. A quantitative comparison of the spectra with the theory of this relaxation mechanism developed by McConnell, Kivelson, and Freed and Fraenkel enables the tumbling frequencies for CH3 and CD3 to be determined. (Author)
AD-668 358 Not available from CFSTI.

IONIC REACTIONS OF UNSATURATED COMPOUNDS. I. POLYMERIZATION OF ACETYLENE,
Aerospace Research Labs Wright-Patterson AFB Ohio
Jean H. Futrell, and Thomas O. Tiernan. Feb 68, 11p Rept no. ARL-68-0041
Availability: Published in Journal of Physical Chemistry, v72 n1 p158-64 968.

Descriptors: (*Mass spectroscopy, Alkynes), (*Alkynes, *Polymerization), Ions, Molecules, Chemical reactions, Molecular energy levels, Deuterated compounds.
Identifiers: *Ion-molecule reactions, Chain reactions (Chemical).

Ion-molecule reactions of acetylene were investigated in conventional, high pressure, and tandem mass spectrometers. Evidence was obtained from ionization efficiency curves and from charge-exchange experiments for the existence of an excited molecule ion, C2H2 (+)*, with an appearance potential of about 15.9 eV, which reacts differently from the ground vibronic state ion, C2H2 (+). Reactions of the individual primary ions and selected secondary, tertiary, and subsequent ions were investigated, and C2D2 was examined in some experiments to clarify mechanistic details and to evaluate isotope effects. A highly branched chain reaction for the ionic polymerization of acetylene is deduced from these results. (Author)
AD-668 369 Not available from CFSTI.

THE OBSERVATION OF MARKERS DURING THE OXIDATION OF COLUMBIUM,

Aerospace Research Labs Wright-Patterson AFB Ohio
J. A. Roberson, and Robert A. Rapp. Mar ? ., 9p Rept no. ARL-68-0044
Availability: Published in Transactions of the Metallurgical Society of AIME, v239 p1327-31 Sep 1967.

Descriptors: (*Niobium, Oxidation), High-temperature research, Low-pressure research, Ions, Diffusion, Niobium compounds, Oxides, Ceramic coatings, Markers, Platinum, Oxidizers, Copper compounds, Scale, Porosity.
Identifiers: Protective coatings.

From the observation of platinum wire marker movement in the oxidation of columbium at high temperatures and low oxygen pressures, predominant cation diffusion in CbO2 has been demonstrated. The Cu2O molecule was used as an oxidizing species to study the nature of the porous scale and the location of the reduction site in the oxidation of columbium. The Cb2O5 scale contains microporosity and forms by alternate ionic diffusional growth and fracture. The oxidation of columbium at high temperatures and very low oxygen pressure results in a relatively compact and protective Cb2O5 layer. (Author)
AD-668 370 Not available from STI.

LEED STUDY OF THE GROWTH OF ALUMINUM FILMS ON THE Ta (110) SURFACE.
Systems Research Labs Inc Dayton Ohio
For primary bibliographic entry see Field 20B.
AD-668 375 Not available from CFSTI.

CRYSTALLIZATION DURING POLYMERIZATION.
Technical rept.,
Rensselaer Polytechnic Inst Troy N Y Dept of Chemistry
Bernhard Wunderlich. 1 Apr 68, 93p Rept no. TR-14
Contract Nonr-591 (19)
Availability: To be published in Advances of Polymer Science.

Descriptors: (*Polymerization, *Crystallization), Polymers, Crystal structure, Molecular structure, Molecular association, Nucleation, Crystal growth, Biochemistry, Reviews.

Crystallization of flexible linear high polymers may be separate from, successive to, or simultaneous with the polymerization reaction. Only the separate crystallization and polymerization has received much attention in the past. In this paper the principles and problems arising out of the crystallization during polymerization are discussed based on a review of the available literature. Nucleation of crystals, reaction mechanisms, the perfection of crystals, solid state polymerization are analyzed for the case of crystallization during polymerization. A comparison of the morphology of polymer melt and solution grown crystals with crystals grown during polymerization is made. (Author)
AD-668 382 Not available from CFSTI.

CALCULATED RAMSAUER-TOWNSEND EFFECT IN 4He-4He COLLISIONS.
Scientific Interim rept.,
Florida State Univ Tallahassee Dept of Physics
J. P. Aldridge, and R. H. Davis. 13 Mar 68, 3p AFOSR-68-0850
Grant AF-AFOSR-440-67
Availability: Published in Physical Review Letters, v19 n18 p1001 Oct 1967.

Descriptors: (*Helium, Interactions), Scattering, Probability, Molecular association, Atomic properties, Superfluidity, Potential energy, Kinetic theory.
Identifiers: Ramsaur-Townsend effect.

It is pointed out that at low bombarding energies the conditions for an atomic Ramsauer-Townsend effect are satisfied in collisions between neutral helium atoms. This is of interest as a predicted example of the effect for atoms and because of its possible relation to the unusual properties of bulk helium at low temperatures.
AD-668 409 Not available from CFSTI.

THERMAL ESCAPE FROM PLANETARY ATMOSPHERES IN THE PRESENCE OF A GRAVITATIONAL FIELD.
Space Sciences Inc Waltham Mass
For primary bibliographic entry see Field 20D.
AD-668 414 Not available from CFSTI.

TABLES OF COLLISION INTEGRALS FOR THE (m, 6) POTENTIAL FOR TEN VALUES OF m.
Rept. for Jan 66-Mar 68,
National Bureau of Standards Washington D C
Max Klein, and F. J. Smith. May 68, 78p
AEDC-TR-68-92
Prepared in cooperation with Queen's Univ., Belfast (Northern Ireland).

Descriptors: (*Gas flow, Statistical mechanics), (*Statistical mechanics, Tables), Molecules, Interactions, Potential energy, Kinetic theory, Distribution functions, Integrals, Functions, Diffusion, Thermal conductivity, Viscosity.
Identifiers: *Collision integrals, Potential functions.

Tables of collsion integrals are presented for the (m, 6) potential function for 87 reduced temperatures for each of 10 values of m. The exponents m used were m = 9, 12, 15, 18, 21, 24, 30, 50, and 75. Comparisons are made with five other calculations for the case m = 12. The accuracy of the calculation appears to be at least several parts in 10,000. (Author)
AD-668 433 HC$3.00 MF$0.65

MERGED STAGNATION SHOCK LAYER OF NONEQUILIBRIUM DISSOCIATING GAS,
Aerospace Corp El Segundo Calif El Segundo Technical Operations
For primary bibliographic entry see Field 22B.
AD-668 442 HC$3.00 MF$0.65

FLUORESCENCE OF DOPED CRYSTALS OF ANTHRACENE, NAPHTHALENE, AND PHENANTHRENE UNDER HIGH PRESSURES: THE ROLE OF EXCIMERS IN ENERGY TRANSFER TO THE GUEST MOLECULES.
Aerospace Corp El Segundo Calif Materials Sciences Lab
For primary bibliographic entry see Field 7E.
AD-668 444 HC$3.00 MF$0.65

EXCIMER EMISSION OF NAPHTHALENE, ANTHRACENE, AND PHENANTHRENE CRYSTALS PRODUCED BY VERY HIGH PRESSURES,
Aerospace Corp El Segundo Calif Lab Operations
For primary bibliographic entry see Field 7E.
AD-668 448 HC$3.00 MF$0.65

INFRARED AND RAMAN VIBRATIONAL STUDY OF ETHYLBENZENE, n-PROPYLBENZENE AND TERMINAL HALOGEN-SUBSTITUTED ANALOGS, 800-50/cm.
Dayton Univ Ohio
For primary bibliographic entry see Field 7C.
AD-668 478 HC$3.00 MF$0.65

SURFACE IONIZATION OF IODINE AND SODIUM ON AN INCANDESCENT POLYCRYSTALLINE TANTALIC THREAD,
Foreign Technology Div Wright-Patterson AFB Ohio
E. P. Sytaya, and N. G. Shuppe. 9 Jun 67, 18p
Rept no. FTD-MT-67-58
Edited machine trans. of Tashkent Univ. Nauchnye Trudy (USSR) n221 p103-12 963.

Descriptors: (*Tantalum, *Work functions), (*Iodine, Ionization), (*Sodium, Ionization), Surface properties, Filaments, Heating, Thermionic emission, USSR.
Identifiers: Translations.

The work presents the results of investigations of the negative ionization of iodine atoms and positive ionization of sodium atoms on an incandescent surface of tantalum, which were undertaken for the purpose of evaluating the magnitude of minimum and maximum work functions of the electrons of surface spots, and the portions of the surface occupied by these spots on a polycrystalline tantalic thread heated by alternating current. (Author)
AD-668 504 HC$3.00 MF$0.65

SOVIET RESEARCH IN HIGH-ENERGY CHEMISTRY.
Joint Publications Research Service, Washington, D. C.
17 Jan 68, 16p
Trans. of Khimiya Vysokikh Energii (USSR) v1 n6 p515-23 1967.

Descriptors: (*Thermochemistry, USSR), Ionosphere, Lasers, Plasma medium, Shock waves, Electric discharges, Excitation, Photochemistry, Radiation Chemistry, Radiochemistry, Reviews.
Identifiers: High energy chemistry.

Recent Soviet progress in the following areas is reviewed: Radiation chemistry, photochemistry, plasma chemistry, chemical reactions in shock waves, chemistry of the ionosphere, nuclear chemistry.
JPRS-44048 HC$3.00 MF$0.65

THERMAL CONDUCTIVITY OF SELECTED MATERIALS. PART 2,
National Standard Reference Data System.
For primary bibliographic entry see Field 20M.
NSRDS-NBS-16-Pt-2 HC$2.00 MF$0.65

SPECTROPHOTOMETRIC DETERMINATION OF TITANIUM IN FERRO-NIOBIUM WITH DIANTIPYRYLMETHANE.
Techtran Corp., Glen Burnie, Md.
R. Kajiyama, and K. Yamaguchi. Mar 68, 7p NASA-TT-F-11586
Contract NASW-1695
Coll- 7 P Refs Tran- Transl. Into English From Japan Analyst, V. 16, No. 9, 1967 P 908-912

Descriptors: *Niobium compounds, *Spectrophotometers, *Titanium, *Trace contaminants, Chemical analysis, Colorimetry, Impurities, Iron compounds, Optical measurement.

For abstract, see STAR 06 10.
N68-19785 HC$3.00 MF$0.65

OVER TENSION AND INTERFACIAL CHEMISTRY.
Ueberspannung Und Grenzflaechenchemie
Aztec School of Languages, Inc., Acton, Mass.
K. Gossner. Mar 68, 109p NASA-TT-F-11543
Contract NASW-1692
Coll- 109 P Refs

Descriptors: *Contact potentials, *Hydrogen, *Interfacial tension, Chemical equilibrium, Dissociation, Electrolytes.

For abstract, see STAR 06 10.
N68-20006 HC$3.00 MF$0.65

ELECTROCHEMICAL CHARACTERIZATION OF NONAQUEOUS SYSTEMS FOR SECONDARY BATTERY APPLICATION QUARTERLY REPORT, NOV. 1967 - JAN. 1968.
Whittaker Corp., San Diego, Calif. Narmco Research and Development Div.

For primary bibliographic entry see Field 10C.
For abstract, see STAR 06 10.
N68-20012 HC$3.00 MF$0.65

TECHNIQUE FOR DETERMINING GASES DISSOLVED IN FUELS, OXIDIZERS, AND LIQUIDS IN GENERAL.
Jet Propulsion Lab., Calif. Inst. of Tech., Pasadena.
For primary bibliographic entry see Field 21I.
For abstract, see STAR 06 10.
N68-20093 HC$3.00 MF$0.65

A METHOD OF SOLVING SETS OF NONLINEAR ALGEBRAIC EQUATIONS PROGRESS REPORT.
Case Western Reserve Univ., Cleveland, Ohio.
R. J. Adler, and S. Y. Ku. 10 Mar 68, 16p NASA-CR-93822, PR-5
Contract NGR-36-003-021

Descriptors: *Computer programs, *Nonlinear equations, *Nuclear magnetic resonance, *Problem solving, Algebra, Algorithms, Digital computers, Linear equations, Polynomials, Spectroscopy.

For abstract, see STAR 06 10.
N68-20194 HC$3.00 MF$0.65

FE 1, CR 1 AND CR 2 GF-VALUES FROM SHOCK-TUBE MEASUREMENTS.
Harvard Coll. Observatory, Cambridge, Mass.
M. Huber, and F. L. Tobey, Jr., Dec 67, 51p
NASA-CR-93856, ESRO-SN-12
Grant NSG-438
Coll- 51 P Refs

Descriptors: *Shock tubes, *Transition probabilities, Absorption spectra, Atomic energy levels, Chromium, Density (number/volume), Electron transitions, Emission spectra, Excitation, High temperature gases, Ions, Line spectra, Populations, Saha equations, Spectral line width, Tables (data), Transition metals.

For abstract, see STAR 06 10.
N68-20405 HC$3.00 MF$0.65

THE IONIZATION POTENTIAL AND HEAT OF FORMATION OF THE (CH3)2N RADICAL BY MASS SPECTROMETRY.
Rocket Propulsion Establishment, Westcott (England).
I. P. Fisher, and E. Henderson. Mar 67, 17p
RPE-TR-67/4
Mar. 1967 Coll- 17 P Refs

Descriptors: *Dimethylhydrazines, *Free radicals, *Heat of formation, *Ionization potentials, *Mass spectroscopy, *Nitrosamine, Electron impact, Energy methods, Methyl compounds, Microstructure, Molecular structure, Nitrogen compounds, Pyrolysis.

For abstract, see STAR 06 10.
N68-20494 HC$3.00 MF$0.65

THERMODYNAMICS OF TRANSPORT PHENOMENA IN MEMBRANE SYSTEMS,
National Bureau of Standards, Boulder, Colo. Inst. for Materials Research.
For primary bibliographic entry see Field 20M.
PB-177 833 HC$3.00 MF$0.65

THIRD VIRIAL COEFFICIENTS OF NONPOLAR GASES AND THEIR MIXTURES,
National Bureau of Standards, Boulder, Colo., Inst. for Materials Research.
For primary bibliographic entry see Field 20M.
PB-177 834 HC$3.00 MF$0.65

TRANSPORT PROPERTIES OF CRYOGENIC LIQUIDS AND THEIR MIXTURES,
National Bureau of Standards, Boulder, Colo. Cryogenics Div.
For primary bibliographic entry see Field 20M.
PB-177 836 HC$3.00 MF$0.65

DISCREPANCIES BETWEEN VISCOSITY DATA FOR SIMPLE GASES,
National Bureau of Standards, Boulder, Colo. Inst. for Materials Research.
H. J. M. Hanley, and G. E. Childs. 1968, 4p
Science, v159 n3819 p1114-7 Mar 8 1968.

Descriptors: (*Gases, *Viscosity), (*Kinetic theory, Viscosity), Statistical mechanics, Transport properties, Interactions, Thermal conductivity, Elastic scattering, Errors.

It has been known for some time that Kestin and his co-workers have reported dilute gas viscosity coefficients which differ from the usually accepted values. Recent work from the Los Alamos Scientific Laboratory supplements Kestin's results. It is shown that there is no evidence for not accepting this different data. It is felt that the whole subject of dilute gas viscosity measurements above room temperature should be reexamined both from the experimenter's and correlater's viewpoints. There is evidence that published tables may be incorrect by as much as 10 percent above 600K. (Author)
PB-177 837 HC$3.00 MF$0.65

ESR SPECTROMETER FOR GASEOUS MEDIA. PART I. PRELIMINARY DESIGN,
California Univ., Berkeley. Lawrence Radiation Lab.
For primary bibliographic entry see Field 14B.
For abstract, see NSA 22 08.
UCRL-17306-pt-1 HC$3.00 MF$0.65

THE MOLECULAR-BEAM ELECTRIC RESONANCE SPECTRA OF NaCl AND NaBr,
California Univ., Berkeley. Lawrence Radiation Lab.
C. A. Melendres, A. J. Hebert, and K. Street, Jr.
Nov 67, 45p
Contract W-7405-eng-48

Descriptors: (*Molecular beams, Sodium compounds), (*Sodium compounds, *Radiofrequency spectroscopy), Sodium chloride, Bromides, Resonance absorption.
Identifiers: Sodium bromide.

For abstract, see NSA 22 08.
UCRL-17916 HC$3.00 MF$0.65

7E. Radio and Radiation Chemistry

ENVIRONMENTAL EFFECTS ON PHOSPHORESCENCE. II. 'ACTIVATION VOLUMES' FOR TRIPLET DECAY OF AROMATIC HYDROCARBONS.
Technical rept.,
California Univ Santa Barbara Dept of Chemistry
B. A. Baldwin, and H. W. Offen. 22 Mar 68, 13p
Rept no. TR-10
Contract N00014-67-A-0120-0001
Availability: To be published in Journal of Chemical Physics.

Descriptors: (*Aromatic compounds, Phosphorescence), Molecular energy levels, Relaxation times, Pressure, Thermochemistry, Molecular association, Electron transitions, Polycyclic compounds.

The rate of triplet decay k was measured to 32 kbar for twenty aromatic hydrocarbons at room temperature. The measured lifetimes are generally shortened by high pressure. The slope of lnk vs. P plots were all linear above 15 kbar. This slope is positive except for terphenyl, and can be related to 'activation volumes' Delta-V* for this kinetic process. The values -1.0 < Delta-V* < 0.2 cu. A/molecule are found for this class of compounds. The perdeuterated compounds have a larger negative 'activation volume' than the corresponding perprotonated aromatics. Hence, environmental perturbations are most effective for slow processes which arise from weak intramolecular perturbations in the solute. (Author)
AD-667 975 Not available from CFSTI.

FLUORESCENCE LIFETIME OF DIPHENYLMETHYLENE.
Technical rept.,
San Diego State Coll Calif Dept of Chemistry
William R. Ware, and P. j. Sullivan. 10 Apr 68, 7p Rept no. TR-1
Contract N00014-66-C-0196-A01
Availability: To be published in Journal of Chemical Physics.

Descriptors: (*Polycyclic compounds, *Fluorescence), Molecular energy levels, Relaxation time, Emissivity, Electron transitions, Probability.
Identifiers: Diphenyl methylenes.

In view of the somewhat unusual nature of the triplet-triplet emission from diphenylmethylene, a measurement was made of the decay time, since this provides, along with the oscillator strength, a test of the assignment that the emission is indeed fluorescence.
AD-667 992 Not available from CFSTI.

FREE RADICAL YIELDS IN POLYTETRAFLUOROETHYLENE AS THE BASIS FOR A RADIATION DOSIMETER.
Rept. for Jun 65-Sep 67,
Aerospace Corp El Segundo Calif Lab Operations
Henry S. Judeikis, Herbert Hedgpeth, and Seymour Siegel. Feb 68, 39p Rept no. TR-0158 (3250-20)-6
SAMSO-TR-68-140
Contract F04695-67-C-0158

Descriptors: (*Dosimeters, Halocarbon plastics), (*Halocarbon plastics, *Free radicals), Halogenated hydrocarbons, Radiation chemistry, Electron spin resonance, Peroxides, Dose rate.

Exposure of polytetrafluoroethylene (PTFE) to ionizing radiation results in chemical degradation of the polymer and formation of long-lived free radicals. The paper describes the use of quantitative measurements of the electron spin resonance (ESR) spectra of the free radical produced in irradiated PTFE to determine radical yields and attempts to correlate these radical yields with the absorbed radiation dose. The experimental results indicate sufficient correlation over the experimental range rad to permit use of PTFE as a passive radiation dosimeter. The advantages inherent in the use of the PTFE dosimeter for the measurement of low energy electromagnetic or particulate radiation are also discussed. Energy deposition as a function of depth from the incident surface can be determined by sectioning of the polymer after irradiation. The resulting dose - depth curves can then be used to obtain spectral and profile data from polychromatic sources. (Author)
AD-668 109 HC$3.00 MF$0.65

RECOMBINATION OF Br ATOMS BY FLASH PHOTOLYSIS OVER A WIDE TEMPERATURE RANGE,
Toronto Univ (Ontario) Dept of Chemistry
For primary bibliographic entry see Field 7D.
AD-668 261 Not available from CFSTI.

PHOTOGRAPHIC SCIENCE AND ENGINEERING, VOL. 12, NO. 1, JANUARY-FEBRUARY 1968.
Society of Photographic Scientists and Engineers Washington D C
For primary bibliographic entry see Field 14E.
AD-668 297 Not available from CFSTI.

PHOTOGRAPHIC SCIENCE AND ENGINEERING, VOL. 11, NO. 3, MAY-JUNE 1967.

Society of Photographic Scientists and Engineers
Washington D C
For primary bibliographic entry see Field 14E.
AD-668 303 Not available from CFSTI.

PHOTOGRAPHIC SCIENCE AND ENGINEERING. VOLUME 11 NUMBER 4, JULY-AUGUST 1967.
Society of Photographic Scientists and Engineers
Washington D C
For primary bibliographic entry see Field 14E.
AD-668 304 Not available from CFSTI.

DOPPLER LINE SHAPE OF ATOMIC FLUORESCENCE OF SODIUM IODIDE,
Comision Nacional de Investigaciones Espaciales Buenos Aires (Argentina)
Howard G. Hanson. Dec 67, 6p
Contract Nonr-710 (59)
Availability: Published in The Journal of Chemical Physics, v47 n11 p4773-7 Dec 1 1967.

Descriptors: (*Sodium compounds, *Atomic spectroscopy), (*Iodides, *Fluorescence), Dissociation, Photolysis, Ultraviolet radiation, Atomic energy levels, Excitation, Emissivity, Doppler effect, Electron transitions, Line spectrum, Hyperfine structure.
Identifiers: Sodium iodide.

Measurements on the Doppler profiles of the sodium D line atomic fluorescence of sodium iodide which accompanies dissociation of the molecule in the vapor state by polarized ultraviolet light in the 2100-2500A range show no pronounced directional effects. The known hyperfine structure of the sodium states, the response of the measuring instrument, and the experimental uncertainties are taken into account. It is suggested that the upper repulsive state of the dissociating molecule is not necessarily a single state, and that some of these upper states possess minima in which some of the excited molecules are trapped for a short time. The measured Doppler speeds are somewhat less than expected when higher energy ultraviolet photons are used, which may be due to dissociations in which the iodine atom is also excited. (Author)
AD-668 305 Not available from CFSTI.

FLUORESCENCE OF DOPED CRYSTALS OF ANTHRACENE, NAPHTHALENE, AND PHENANTHRENE UNDER HIGH PRESSURES: THE ROLE OF EXCIMERS IN ENERGY TRANSFER TO THE GUEST MOLECULES,
Aerospace Corp El Segundo Calif Materials Sciences Lab
Peter F. Jones, and Malcolm Nicol. Feb 68, 36p
Rept no. TR-0158 (9250-01)-1
SAMSO-TR-68-145
Contract F04695-67-C-0158
Prepared in cooperation with California Univ., Los Angeles, Dept. of Chemistry, Contract AT (11-1)-34.

Descriptors: (*Polycyclic compounds, *Fluorescence), Anthracenes, Naphthalenes, Phenanthrenes, Impurities, Solid solutions, Excitation, Emissivity, Molecular energy levels, Excitons, High-pressure research, Spectroscopy.
Identifiers: *Eximers, Naphthacenes.

Fluorescence spectra of crystals of anthracene, naphthalene, phenanthrene doped with other polycyclic aromatic hydrocarbons have been studied at pressures as great as 50 kbar. The most significant effects of pressure on the spectra of the host crystals are a loss of intensity of the normal fluorescence with increasing pressure and the almost simultaneous appearance of a broad, featureless emission at energies about 3000 to 6000/cm lower than that of the normal fluorescence. This emission is assigned as the fluorescence of excimers formed upon optical excitation of the crystals under high pressure. The growth of the intensity of the excimer emission with increasing pressure, relative to the intensity of the normal fluorescence, is the same in doped crystals as in pure crystals. The intensities of the guest molecule fluorescences relative to the intensity of the normal host fluorescence in the various doped crystals increase with pressure at about the same rate as the intensity of the excimer emission. These observations are interpreted as indicating that excimers are the lowest-energy excited singlet species of aromatic molecular crystals at these pressures and that, when the excimer concentration is appreciable, the path of energy transfer is from the host via excimers to the guest. (Author)
AD-668 444 HC$3.00 MF$0.65

EXCIMER EMISSION OF NAPHTHALENE, ANTHRACENE, AND PHENANTHRENE CRYSTALS PRODUCED BY VERY HIGH PRESSURES,
Aerospace Corp El Segundo Calif Lab Operations
Peter F. Jones, and Malcolm Nicol. Feb 68, 36p
Rept no. TR-0158 (9250-01)-4
SAMSO-TR-68-161
Contract F04695-67-C-0158
Prepared in cooperation with California Univ., Los Angeles. Dept. of Chemistry.

Descriptors: (*Polycyclic compounds, *Fluorescence), Naphthalenes, Anthracenes, Phenanthrenes, High-pressure research, Spectroscopy, Molecular energy levels, Excitation, Emissivity, Continuous spectrum, Crystal lattice defects.
Identifiers: *Eximers.

Fluorescence spectra of ultra-pure crystals of naphthalene, anthracene, and phenanthrene were studied at pressures as great as 50 kbar. These spectra exhibit complex irreversible effects superimposed upon the expected reversible shifts in the energies of the normal fluorescence spectra. The irreversible effects include a loss of the intensity of the normal fluorescence with increasing pressure and the almost simultaneous appearance of a broad, featureless emission at energies about 3000 to 6000/cm lower than that of the normal fluorescence. This emission is assigned as the fluorescence of excimers formed upon optical excitation of the crystals under high pressure. The crystals continue to exhibit this excimer fluorescence after the pressure is reduced to atmospheric pressure, but the irreversible effects can be removed by thermal annealing of the crystal at atmospheric pressure. The irreversibility is attributed to trapping of pairs of molecules in an excimer-like orientation as a crystal defect after they lose the excitation energy of the excimer. These defects then act as traps for excitation energy in the crystal. Other possible interpretations of the irreversible effects are discussed. (Author)
AD-668 448 HC$3.00 MF$0.65

ANNUAL REPORT, JULY 1, 1967.
Brookhaven National Lab., Upton, N. Y.
For primary bibliographic entry see Field 6R.
For abstract, see NSA 22 08.
BNL-50057 HC$3.00 MF$0.65

RUTHENIUM DIOXIDE-OXYGEN-RUTHENIUM TETROXIDE EQUILIBRIUM,
Idaho Nuclear Corp., Idaho Falls.
B. D. Penman, and R. R. Hammer. Jan 68, 7p
Contract AT (10-1)-1230

Descriptors: (*Radioactive waste, Ruthenium compounds), (*Ruthenium compounds, Phase studies), Oxides, Ruthenium, Oxygen, Vapors, Fission products.
Identifiers: Ruthenium oxides.

For abstract, see NSA 22 08.
IN-1013 HC$3.00 MF$0.65

SOVIET RESEARCH IN HIGH-ENERGY CHEMISTRY.
Joint Publications Research Service, Washington, D. C.
For primary bibliographic entry see Field 7D.
JPRS-44048 HC$3.00 MF$0.65

EFFECTS OF MATRIX GASES ON THE ALPHA IONIZATION GAS ANALYZER FOR URANIUM HEXAFLUORIDE,
Oak Ridge Gaseous Diffusion Plant, Tenn.
W. S. Pappas. 15 Jan 68, 13p
Contract W-7405-eng-26

Descriptors: (*Uranium compounds, *Gas analysis), Fluorides, Ionization, Reactor coolants, Radiological contamination.
Identifiers: Uranium hexafluorides.

For abstract, see NSA 22 08.
K-1719 HC$3.00 MF$0.65

SPECTROPHOTOMETRIC DETERMINATION OF VANADIUM IN PLUTONIUM-VANADIUM ALLOYS,
Los Alamos Scientific Lab., N. Mex.
W. J. Baughman, and G. R. Waterbury. 2 Jan 68, 9p
Contract W-7405-eng-36

Descriptors: (*Plutonium alloys, Spectroscopy), (*Vanadium, Spectroscopy), Vanadium alloys, Complex compounds, Absorption spectrum.

For abstract, see NSA 22 08.
LA-3843 HC$3.00 MF$0.65

UNIT OPERATIONS SECTION QUARTERLY PROGRESS REPORT, JANUARY-MARCH 1967.
Oak Ridge National Lab., Tenn.
For primary bibliographic entry see Field 7A.
For abstract, see NSA 22 08.
ORNL-4139 HC$3.00 MF$0.65

ANALYTICAL CHEMISTRY DIVISION ANNUAL PROGRESS REPORT FOR PERIOD ENDING OCTOBER 31, 1967,
Oak Ridge National Lab., Tenn.
Helen P. Raaen. Jan 68, 171p
Contract W-7405-eng-26

Descriptors: (*Chemical analysis, Reviews), Radiochemistry, Radiation chemistry, Instrumentation, Spectroscopy, Biochemistry.

For abstract, see NSA 22 08.
ORNL-4196 HC$3.00 MF$0.65

8. EARTH SCIENCES AND OCEANOGRAPHY

8A. Biological Oceanography

A SHARK-BITE METER,
Cornell Univ Ithaca N Y
For primary bibliographic entry see Field 6C.
AD-668 348 Not available from CFSTI.

PRELIMINARY IN VIVO STUDIES ON PUPILLARY AND TAPETAL PIGMENT RESPONSES IN THE LEMON SHARK, NEGAPRION BREVIROSTRIS,
Cornell Univ Ithaca N Y
For primary bibliographic entry see Field 6C.
AD-668 349 Not available from CFSTI.

TOOTH REPLACEMENT IN THE LEMON SHARK, NEGAPRION BREVIROSTRIS,
Cornell Univ Ithaca N Y
For primary bibliographic entry see Field 6C.
AD-668 350 Not available from CFSTI.

Group 8A—Biological oceanography

ELECTROENCEPHALOGRAPHIC STUDIES OF CHEMORECEPTION IN SHARKS,
Cornell Univ Ithaca N Y
For primary bibliographic entry see Field 6C.
AD-668 351 Not available from CFSTI.

THE LAW OF THE SEA. THE FUTURE OF THE SEA'S RESOURCES.
Technical rept. no. 2, 31 Mar 67-31 Mar 68,
Rhode Island Univ Kingston Law of the Sea Inst
Lewis M. Alexander. Mar 68, 185p Rept no. TR-2
Contract Nonr-396 (16)
Proceedings of the Annual Conference (2nd) of the Law of the Sea Institute, June 26-29, 1967.
Availability: Hard copy available from Law of the Sea Inst., Rhode Island Univ., Kingston, R. I. $5.50.

Descriptors: (*Oceanology, Symposia), Oceans, Natural resources, Scientific research, Oceanographic data, Law, Commerce, Aquatic animals, Fishes, Economics, Minerals, Foreign policy, Geophysical prospecting, Manganese, Petroleum, Navigation, Rhode Island.

The book contains the texts of twenty professional papers, as well as shorter statements by panel participants, and considerable verbatim discussions. Starting with the theme of the need for rules and rights in the use of the sea, the proceedings then go on to consideration of existing fisheries arrangements and their implications, conflicts of uses in the sea, and alternative regimes for the sea, ending with a discussion on the future development of world fisheries. In this latter connection, considerable attention was paid to the problems of U.S. jurisdiction over its fisheries resources beyond the twelve-mile limit. (Author)
AD-668 362 MF$0.65

ISOPRENOID ACIDS IN RECENT SEDIMENTS.
Technical rept.,
Woods Hole Oceanographic Institution Mass
Max Blumer, and W. J. Cooper. Apr 68, 5p Rept no. WHOI-Ref-68-21
Contract N00014-66-C-0241, Grant NSF-GA-539
Availability: Published in Science, v158 n3807 p1463-4 Dec 1967.

Descriptors: (*Sedimentation, *Fatty acids), Isoprene, Lipids, Fatty acid esters, Deposits, Hydrocarbons, Geologic age determination, Gas chromatography, Plankton, Fishes, Sampling, Continental shelves, Massachusetts.

Phytanic acid, pristanic acid, and 4,8,12-trimethyltridecanoic acid have been isolated from three recent marine sediments. The ratio of palmitic to pristanic acid is similar to that encountered in typical marine lipids. This suggests a biochemical origin of these sedimentary acids; phytol is their presumed biochemical precursor. Other isoprenoid acids between C11 and C22 which are common in ancient sediments have not been found. They are probably geochemical products formed slowly and at a greater depth. (Author)
AD-668 379 Not available from CFSTI.

BIOLOGICAL FOULING OF TRANSPARENT PLASTICS.
Technical memo.,
Naval Missile Center Point Mugu Calif
C. V. Metzler. 29 May 68, 24p Rept no. NMC-TM-68-9

Descriptors: (*Plastics, *Fouling), Underwater vehicles, Acrylic resins, Algae, Aquatic animals, Marine biology, Visibility, Deterioration, Antifouling coatings, Reviews.

The report covers the results and summary of a literature search related to the marine biological fouling of various transparent plastics that could be used for undersea observatories. The report also covers the results of limited testing to acquire and identify biological samples that collected on plastic specimens suspended in the sea from the Point Mugu pier at the head end of Mugu Canyon. (Author)
AD-668 491 HC$3.00 MF$0.65

OBSERVATIONS ON SARDINE BEHAVIOR UNDER ARTIFICIAL LIGHT.
National Science Foundation, Washington, D. C. Special Foreign Currency Science Information Program.
For primary bibliographic entry see Field 6C.
TT-67-58026 HC$3.00 MF$0.65

8B. Cartography

IMPLICATIONS OF SYMBOL USAGE ON U. S. ARMY MAPS FOR AN AUTOMATED CARTOGRAPHIC SYSTEM.
Technical rept. (Final), May 67-Feb 68,
American Institutes for Research Pittsburgh Pa
Walter R. Horner, and Sanford P. Schumacher.
Feb 68, 66p Rept no. AIR-G1-2/68-FR
Contract DAAK02-67-C-0456
See also AD-667 986.

Descriptors: (*Armed forces (United States), Mapping), (*Symbols, Automation), Standards, Programming (Computers), Feasibility studies, Maps, Classification, Sampling, Statistical data, Analysis, Graphics, Selection, Frequency, Geography, Earth (Planet), Terrain, Geometric forms.
Identifiers: Trade-offs, *Automated cartographic system.

Since it is not economically feasible to produce by automatic means all standard AMS symbols in an automated cartographic system, it becomes important to know their relative frequency of use throughout the world. It is also pertinent to analyze these symbols with respect to system design and development, so as to provide criteria for decisions relative to assignments for production by automatic or manual methods to an operational system. (Author)
AD-667 979 HC$3.00 MF$0.65

TECHNICAL APPENDICES TO IMPLICATIONS OF SYMBOL USAGE ON U. S. ARMY MAPS FOR AN AUTOMATED CARTOGRAPHIC SYSTEM.
Final technical rept.,
American Institutes for Research Pittsburgh Pa
Walter R. Horner, and Sanford P. Schumacher.
Feb 68, 161p Rept no. AIR-G1-2/68-FR
Contract DAAK02-67-C-0456
See also Basic report, AD-667 979.

Descriptors: (*Armed forces (United States), Mapping), (*Symbols, Automation), Standards, Programming (Computers), Feasibility studies, Maps, Classification, Geography, Earth (Planet), Graphics, Geometric forms, Tables, Inventory, Numerical methods and procedures, Site selection.
Identifiers: *Automated cartographic systems.

The document presents symbols considered feasible in world-wide mapping operations to be conducted by automation.
AD-667 986 HC$3.00 MF$0.65

EVALUATION OF THE ACCURACY OF GRAVIMETRIC MAPS.
Aeronautical Chart and Information Center St Louis Mo Linguistic Section
For primary bibliographic entry see Field 8N.
AD-668 177 HC$3.00 MF$0.65

INFLUENCE OF A SOLAR ACTIVE REGION ON THE INTERPLANETARY MAGNETIC FIELD.
California Univ Berkeley Space Sciences Lab
For primary bibliographic entry see Field 20C.
AD-668 377 Not available from CFSTI.

8C. Dynamic Oceanography

LONG WAVES OVER WAVY BOTTOMS.
Technical rept.,
Chicago Univ Ill Dept of the Geophysical Sciences
L. F. McGoldrick. Jan 68, 69p Rept no. TR-1
Contract N00014-67-A-2085-0002

Descriptors: (*Ocean waves, Propagation), Shallow water, Theory, Stability, Water waves, Ocean bottom, Velocity, Ocean bottom topography, Surface properties, Mathematical analysis, Analog systems, Electrical properties, Tables.
Identifiers: *Long waves (Marine).

The propagation of long waves over bottoms having sinusoidal undulations is investigated here within the confines of linearized shallow water theory. It is found that the presence of this irregularity in most cases impedes the propagation of the wave in keeping with the proper application of the Green-DuBoys formula. For wavelengths for which this formula is not valid, or those of the same order as the bottom wavelengths, it is found that there is a region for which the propagation is not retarded, and the travel time is less than that based upon the mean depth. Furthermore, the presence of regular undulations of the bottom of any amplitude prohibits the propagation of an infinite sequence of wavelengths on the surface, the most significant of which are those of the same order as the bottom. These waves are unstable, and through resonance with the bottom will grow without bound as they progress, or at least until the linearized theory is invalidated. An electrical analog is presented which exhibits the same instability, a subharmonic resonance, and can be used to determine the free surface profiles. (Author)
AD-668 185 HC$3.00 MF$0.65

OBSERVATION AND ANALYSIS OF THE SURFACE WIND OVER THE OCEAN.
Koninklijk Nederlands Meteorologisch Instituut, the Hague.
For primary bibliographic entry see Field 4B.
For abstract, see STAR 06 10.
N68-19679 HC$3.00 MF$0.65

THE SOUTHERN OSCILLATION AND WORLD WEATHER.
Koninklijk Nederlands Meteorologisch Instituut, the Hague.
For primary bibliographic entry see Field 4B.
For abstract, see STAR 06 10.
N68-19855 HC$3.00 MF$0.65

OCEANOGRAPHY USING REMOTE SENSORS STATUS REPORT, 1 SEP. 1967 - 1 JAN. 1968.
Texas A&M Univ., College Station. Dept. of Oceanography.
L. R. Capurro. 1 Jan 68, 15p NASA-CR-93779, AD-664660
Contract NONR-2119/04/
Spon- Sponsored in Part By Nasa

Descriptors: *Cloud photography, *Oceanography, *Spaceborne photography, Apollo project, Cloud cover, Detection, Ice formation, Infrared detectors, Sea water, Ships, Temperature gradients.

For abstract, see STAR 06 10.
N68-20041 HC$3.00 MF$0.65

8D. Geochemistry

ISOPRENOID ACIDS IN RECENT SEDIMENTS.
Woods Hole Oceanographic Institution Mass
For primary bibliographic entry see Field 8A.
AD-668 379 Not available from CFSTI.

8E. Geodesy

GEOGRAPHY AND THE PROPERTIES OF SURFACES. N-DIMENSIONAL SPATIAL ANALYSIS AND COMPUTER GRAPHICS. PART A.
Harvard Univ Cambridge Mass Lab for Computer Graphics
For primary bibliographic entry see Field 12A.
AD-668 405 HC$3.00 MF$0.65

BERMUDA ADJUSTMENT AND RADAR CALIBRATION PROJECTS (AF65 - RAD 1-4) (AF67 - 12 ESD).
Technical rept.,
Aeronautical Chart and Information Center St Louis Mo
Donovan N. Huber, and William L. Gleiber. Jan 68, 23p Rept no. ACIC-TR-106

Descriptors: (*Geodesics, Satellites (Artificial)), Cameras, Camera shutters, Radar stations, Calibration, Accuracy, Time signals, Comparators, Interpolation, Polynomials, Astronomical geodesics, Triangulation, Matrix algebra, Interferometers, Bermuda.
Identifiers: Echo 1 satellite, Echo 2 satellite, Pageos satellite, Geodetic satellites.

The addition of the chopping shutter has greatly expanded the Air Force geodetic capability through observation of passive satellites. The Mod III, Rapidyne, external chopping shutter and the GDI-5 internal equipment both became operational early in 1966. Four Mod III's and PC-1000 cameras were deployed in October to sites along the United States Coast and Geodetic Survey (USC and GS) Precise Traverse on the East Coast and at Grand Forks, N.D. and Bermuda to collect data for two radar calibration projects and triangulation adjustments. One other PC-1000, with a GDI-5 internal shutter was located at Bedford, Mass. principally for radar calibration. Simultaneous observations were fabricated through precise timing records. The reduced data reached an internal consistency of 1/1,000,000 and datum shifts derived for the Bermuda local datum differed by only 20 feet from shifts determined by the USC and GS with BC-4 data. In addition to the accuracies achieved, more data can be obtained in the same period of time observing passive satellites. Other projects are in work and planned for further use of the Mod III optical system. (Author)
AD-668 431 HC$3.00 MF$0.65

8F. Geography

PROCEEDINGS OF THE ARCTIC BASIN SYMPOSIUM OCTOBER 1962.
Arctic Inst. of North America, Washington, D.C. Jun 63, 313p

Descriptors: (*Arctic regions, Symposia), Polar regions, Sea water, Oceanographic data, Ocean bottom topography, Ocean bottom sampling, Ocean currents, Temperature, Terrestrial magnetism, Salinity, Turbulence, Plankton, Ice, Aurorae, Sky brightness, Upper atmosphere, Earthquakes, Anomalies.
Identifiers: Hydrosphere, Arctic basin (Geology).

Because of its remoteness, the severity of its climate, and the logistic problems which these two factors impose, efforts at scientific study in the Arctic must generally be made on a geographic rather than on a strictly disciplinary basis. It is for this reason that interdisciplinary and international collaboration is here even more important than elsewhere, if we are to make the most of the far from complete coverage which scientists have been able to provide in the fields of study pertinent to the polar basin. In its successive sessions, the Arctic Basin was considered from the sea floor upward, through the sea water and the ice, into the atmosphere and beyond. The four sessions were: Sea Floor and Below; Hydrosphere; Ice; Atmosphere and Above. The objectives of the Conference, as stated in the program, were to appraise the present knowledge of the Arctic Basin, to exchange information on existing programs of research, and to obtain from leading scientists recommendations for future scientific programs. It is hoped that the publication of these proceedings will reveal the success of the first two of these objectives. The final paper gives a summation of the recommendations for future programs as generated during informal discussions at the conference and crystallized at subsequent meetings.
AD-441 307 HC$3.00

SEQUENTIAL STUDY OF DESERT FLOODING IN THE WHITE MOUNTAINS OF CALIFORNIA AND NEVADA.
Montana Univ Missoula Dept of Geography
For primary bibliographic entry see Field 8H.
AD-667 978 HC$3.00 MF$0.65

DELTA-FRONT DIAPIRS OFF MAGDALENA RIVER, COLOMBIA COMPARED WITH HILLS OFF OTHER LARGE DELTAS,
Scripps Institution of Oceanography La Jolla Calif
For primary bibliographic entry see Field 8H.
AD-668 027 Not available from CFSTI.

SCIENTIFIC PROGRESS AND FACILITIES OF THE LATVIAN SSR,
Joint Publications Research Service, Washington, D. C.
For primary bibliographic entry see Field 13B.
JPRS-43944 HC$3.00 MF$0.65

8G. Geology and Mineralogy

DELTA-FRONT DIAPIRS OFF MAGDALENA RIVER, COLOMBIA COMPARED WITH HILLS OFF OTHER LARGE DELTAS,
Scripps Institution of Oceanography La Jolla Calif
For primary bibliographic entry see Field 8H.
AD-668 027 Not available from CFSTI.

ON THE KERATOPHYRE-SPILITIC FORMATION OF THE SOUTH-YENISEY MOUNTAIN RIDGE AND THE POSSIBLE NATURE OF THE KASSKAYA MAGNETIC ANOMALY.
Aeronautical Chart and Information Center St Louis Mo Linguistic Section
For primary bibliographic entry see Field 8N.
AD-668 176 HC$3.00 MF$0.65

CRUSTAL STRUCTURE OF GREAT BRITAIN,
Durham Univ (England) Dept of Geology
M. H. P. Bott. 20 Feb 64, 25p Rept no. Scientific-1
Contract AF 61 (052)-733
See also Scientific rept. no. 3, AD-616-093.

Descriptors: (*Structural geology, Great Britain), (*Seismology, Great Britain), Seismic waves, Propagation, Geological survey, Electronic recording systems, Portable, Digital systems, Stratigraphy, Granite, Underground explosions, Detectors, Correlation techniques, Digital-to-analog converters, Phased arrays, Crystal oscillators, Microseisms.

The report is a project to investigate variations in continental crustal structure by seismic methods, using artificial sources such as quarry blasts at ranges of 100 to 200 kilometres. The project involves the construction of a transportable array of detectors with linear dimensions of several kilometres. The equipments may be divided into four main units. Firstly, there is the short point unit, which records on magnetic tape a time signal radio station, a crystal clock output, the shot instant and a strong motion geophone channel. Secondly, there is the transportable array with digital magnetic tape recording of ten information channels and of timing and control information. At the time of recording the digital information on any one channel may be replayed to a simple one channel digital-to-analogue converter, designed to drive a galvanometer recorder. (Author)
AD-668 206 HC$3.00 MF$0.65

TOPOGRAPHY AND HEAT FLOW OF THE FIJI PLATEAU,
Scripps Institution of Oceanography La Jolla Calif
J. C. Sclater, and H. W. Menard. 13 Nov 67, 7p
Research supported in part by NSF and ONR.
Availability: Published in Nature, v216 n5119 p991-3 Dec 9 1967.

Descriptors: (*Structural geology, Pacific Ocean Islands), (*Thermal conductivity, Plateaus), Echo ranging, Magnetic fields, Anomalies, Thickness, Mountains, Granite, Refraction, Terrain, Faults (Géology), Volcanoes, Penetration, Sedimentation, Ocean bottom, Measurement, Oceanographic vessels, Maps.
Identifiers: Seamounts, Argo (Oceanographic vessel), Horizon (Oceanographic vessel).

The Fiji Plateau is an extensive region at a depth intermediate between continent and ocean basins. Above it rise the islands of Fiji where acidic plutonic rocks occur within an ocean basin in a tectonic setting which can only be compared with the granitic Seychelles Islands in the deep western Indian Ocean. The results of the few seismic refraction lines run on the plateau indicate a variable crust of intermediate thickness. In this preliminary communication we discuss results in topography and heat flow and suggest a relationship between them. Twenty-five measurements of heat flow were made from R.V. Horizon and three from R. V. Argo during July and August. (Author)
AD-668 272 Not available from CFSTI.

DETERMINATION OF THE COMPOSITION OF ROCKS OF THE PALEOZOIC BASEMENT ACCORDING TO CHARACTERISTIC PECULIARITIES OF THE ANOMALOUS MAGNETIC FIELD.
Technical translation,
Aeronautical Chart and Information Center St Louis Mo Linguistic Section
A. V. Glazunova. Feb 68, 18p
ACIC-TC-1348
Trans. of Akademiya Nauk Turkmenskoi SSR, Ashkhabad. Izvestiya. Seriya Fiziko-Tekhnicheskikh, Khimicheskikh i Geologicheskikh Nauk, n6 p65-74 1966, tr. by Walter L. Burton.

Descriptors: (*Structural geology, USSR), Rock (Geology), Magnetic fields, Magnetic anomaly detection, Paleontology, Aerial photographs, Maps, Deposits, Sedimentation, Metamorphic rock, Physical properties, Gravity, Sedimentary rock, Magnetic properties, Intensity.
Identifiers: Translations, Graphs (Charts).

The translation discusses at length, and shows with graphs and charts, the comparison of results of the aeromagnetic survey with drilling data. It is indicated that aeromagnetic investigations are effective in determining the material composition of rocks of the Paleozoic basement in a geologically closed area. The conclusions drawn from this work are as indicated: (1) Determination of the basement rocks should be carried out on the basis of physical properties of rocks and peculiarities of the anomalous magnetic field above open areas, where known Paleozoic complexes of rocks are exposed on the surface. (2) While dividing the Paleozoic basement rocks in terms of material composition it is necessary to consider the depth of occurrence of magnetic rocks which cause T anomalies. (3) On a geologically closed area an analysis of the anomalous magnetic field from the point of view of determining the composition of the Paleozoic basement should be carried out in combination with the gravimetric data. (Author)
AD-668 301 HC$3.00 MF$0.65

THE LAW OF THE SEA. THE FUTURE OF THE SEA'S RESOURCES.
Rhode Island Univ Kingston Law of the Sea Inst
For primary bibliographic entry see Field 8A.
AD-668 362 MF$0.65

MULTISPECTRAL PHOTOGRAPHIC STUDIES OF A RED-BED FACIES, MINAS BASIN, NOVA SCOTIA.

Group 8G — Geology and mineralogy

Environmental research papers no. 276,
Air Force Cambridge Research Labs L G Hanscom Field Mass
George D. Brown, Jr., John F. Cronin, James W. Skehan, Richard W. Dowling, and Dennis W. O'Leary. Nov 67, 36p Rept no. AFCRL-67-0603

Descriptors: (*Photogeology, Nova Scotia), Structural geology, Infrared photography, Spectrophotometers, Spectra (Visible + ultraviolet), Photographic techniques, Reflectivity, Surface properties.
Identifiers: *Multispectral photography, Paddy Island (Canada), Blomidon Cliff (Canada), *Manadnocks (Geology), Peneplanation (Geology), Lithology.

For certain geologic-atmospheric interface environments, spectral photometric and photographic techniques are useful in three ways: first, to delineate lithologic units; second, to determine lithologic characteristics; and third, to provide information of the present environment. Investigations were conducted at two sites in the Minas Basin of Nova Scotia where variegated beds of the Triassic Wolfville and Blomidon formations are exposed. Laboratory spectrophotometric measurements, field photometric data, and narrow band photography of the sedimentary units demonstrate an increase, in the visible spectrum, of reflectivity with increase in wavelength of the incident radiant energy. Inorganic encrustations substantially alter the spectral characteristics of sedimentary units in situ. (Author)
AD-668 438 HC$3.00 MF$0.65

BIBLIOGRAPHY OF REMOTE SENSING OF RESOURCES.
Army Corps of Engineers, Fort Belvoir, Va.
N. E. Jones. Sep 66, 40p NASA-CR-93738
NASA ORDER R-47-009-006

Descriptors: *Aerospace sciences, *Bibliographies, *Infrared detectors, *Radar detection, *Remote handling, Geology, Meteorology, Oceanography, Photographic recording, Remote control, Space flight, Spaceborne photography, Ultraviolet spectra.

For abstract, see STAR 06 10.
N68-19870 HC$3.00 MF$0.65

GRADE COMPUTER PROGRAM FOR CALCULATING URANIUM ORE RESERVES,
Grand Junction Office (AEC), Colo. Production Evaluation Div.
James H. Scott. Jul 63, 25p

Descriptors: (*Uranium, Ores (Metal sources)), (*Computer programs, Uranium), Digital computers, Underground structures, Minerals, Geophysical prospecting, Thickness, Sampling, Flow charting, Input-output devices.

For abstract, see NSA 22 08.
RME-145 HC$3.00 MF$0.65

8H. Hydrology and Limnology

BREAKUP OF ICE, MEADE RIVER, ALASKA.
Cold Regions Research and Engineering Lab Hanover N H
For primary bibliographic entry see Field 8L.
AD-667 946 HC$3.00 MF$0.65

SEQUENTIAL STUDY OF DESERT FLOODING IN THE WHITE MOUNTAINS OF CALIFORNIA AND NEVADA.
Technical rept.,
Montana Univ Missoula Dept of Geography
Chester B. Beaty. Jan 68, 106p
USA-NLABS-TR-68-31-ES, ES-37
Contract DA-19-129-AMC-987 (N)

Descriptors: (*Deserts, *Floods), Mountains, Clouds, Storms, Atmospheric precipitation, Intensity, Drainage, Snow, Safety, Flow fields, Thunderstorms, Damage, Roads, Deposits, Aerial photographs, Maps, California, Nevada.
Identifiers: Summer (Season).

A field study of flood conditions in the White Mountains of California and Nevada was carried out during the period September 1966 to August 1967. The investigation was a follow-up to a similar study conducted in 1956-57. Flooding during the decade 1957-66 has produced significant changes in parts of the White Mountain landscape. One minor and two major debris flows occurred during the period, and minor snowmelt flooding was frequent. Flooding observed during the contract period was of the three types known to occur in the study area: wintertime, snowmelt, and cloudburst floods. Floods were observed in December 1966, May-June 1967, and July-August 1967. The observed and reconstructed behavior of floods in and near the White Mountains during the period 1957-66 was in accord with the indicated principles. (Author)
AD-667 978 HC$3.00 MF$0.65

THE POSSIBLE INFLUENCE OF ADDITIONAL EVAPORATION FROM RESERVOIRS AND IRRIGATED TRACTS ON PRECIPITATION,
Rand Corp Santa Monica Calif
A. S. Grigoreva. Apr 68, 5p Rept no. P-3826
Trans. from Glavnaya Geofizicheskaya Observatoriya, Leningrad. Trudy (USSR), n211 1967, tr. by S. M. Olenicoff.

Descriptors: (*Hydrology, USSR), Atmospheric precipitation, Atmospheric motion, Evaporation, Water supplies, Dams, Irrigation systems, Humidity, Predictions, Numerical methods and procedures.
Identifiers: Translations.

It is shown that measures for the creation of reservoirs, and the irrigation and watering of lands, which are projected through 1980, will only slightly affect precipitation over large territories.
AD-668 008 HC$3.00 MF$0.65

DELTA-FRONT DIAPIRS OFF MAGDALENA RIVER, COLOMBIA COMPARED WITH HILLS OFF OTHER LARGE DELTAS,
Scripps Institution of Oceanography La Jolla Calif
Francis P. Shepard. Apr 68, 12p
Contract Nonr-2216 (23)
Availability: Published in Transactions of the Gulf Coast Association of Geological Societies, v17 p316-25 1967.

Descriptors: (*Deltas, Rivers), (*Structural geology, Colombia), Ocean bottom, Echo ranging, Underwater sound, Reflection, Mud, Volcanoes, Oceanographic vessels, Shallow water, Ocean bottom topography, Bathythermograph data, Deposits, Avalanches, Maps.
Identifiers: AGOR 9, Magdalena River (Colombia).

Exploration of the slope off the Magdalena River with reflection profiling has shown a series of large diapiric intrusions with hills rising as much as 600 feet above the sea floor. These diapirs are mostly bordered by down-bent formations in contrast to the usual, but not invariable, up bending around salt domes. Because salt domes are unknown in the entire area, and because plastic mud layers must be common in the delta-front beds, it seems likely that these are mud diapirs or possibly some type of underwater mud volcanoes. The mud lump islands off the Mississippi Delta have generally been considered rather unique. However, the finding of diapiric intrusions, which are probably mud, off the Magdalena Delta and the finding of many hills off other deltas suggests that such intrusions may not be unusual. (Author)
AD-668 027 Not available from CFSTI.

JAROSLAV CERNI INSTITUTE FOR DEVELOPMENT OF WATER RESOURCES: TRANSACTIONS, VOL. 14, NO. 40, 1967.
National Science Foundation, Washington, D. C. Special Foreign Currency Science Information Program.
1967, 78p SFCSI-Int (TT-67-58016-1)
Trans. of Institut za Vodoprivredu 'Jaroslav Cerni'. Saopstenja (Yugoslavia) v14 n40 n.p. 1967, tr. by Jelena Markovic, Vladimir Skerl, and Petar Mijuskovic.

Descriptors: (*Hydrology, Yugoslavia), (*Water supplies, Yugoslavia), Soils, Salinity, Sedimentation, Erosion, Fluid dynamic properties, Turbulence, Reclamation, Mathematical prediction, Inland waterways, Scientific research, Transport properties.
Identifiers: Translations.

Contents: Observations on some assumptions in suspended sediment transport kinetics; Some results of measuring sedimentation on the river Velika Morava; Reclamation of saline soils in the Chelif river valley and the Macta plain; Some elements for calculating bed deformation in self-cutting alluvial water courses; A review of the work of Jaroslav Cerni Institute for the development of water resources for the year 1966.
TT-67-58016-1 HC$3.00 MF$0.65

8I. Mining Engineering

THE LAW OF THE SEA. THE FUTURE OF THE SEA'S RESOURCES.
Rhode Island Univ Kingston Law of the Sea Inst
For primary bibliographic entry see Field 8A.
AD-668 362 MF$0.65

BALANCING OF PARTIAL OPTIMA BY MEANS OF A LEARNING MONTE CARLO APPROACH. AN APPLICATION IN UNDERGROUND COAL MINING.
Research rept.,
Carnegie-Mellon Univ Pittsburgh Pa Management Sciences Research Group
Manfred Meyer. Apr 68, 15p Rept no. RR-131
Contract Nonr-760 (24)
See also AD-646 724. Published in German in Betriebswirtschaftliche Forschung und Praxis 19 (1967) p584.

Descriptors: (*Production control, Mining engineering), (*Coal, *Mining engineering), (*Operations research, Mining engineering), Monte Carlo method, Optimization, Adaptive systems, Railroads, Transportation, Costs, Systems engineering, Algorithms, West Germany.

There are two important problems in underground hard coal mining which have recently been solved: short run production planning in the faces and planning of the locomotive traffic in main haulage roads. Mutual independence has usually been assumed for these problems and 'optima' have been computed accordingly. However, this independence is not usually valid so that the resulting optima are not global. Treating both problems simultaneously in all their interrelations is unwieldy and impractical. Here a method is proposed for balancing the partial optima by means of a learning Monte Carlo approach using sets of ratios. An algorithm and results of an application are given. (Author)
AD-668 484 HC$3.00 MF$0.65

8J. Physical Oceanography

PROCEEDINGS OF THE ARCTIC BASIN SYMPOSIUM OCTOBER 1962.
Arctic Inst. of North America, Washington, D.C.
For primary bibliographic entry see Field 8F.
AD-441 307 HC$3.00

UNITED STATES NAVAL OCEANOGRAPHIC OFFICE MARINE GEOPHYSICAL SURVEY

PROGRAM 1965-1967 NORTH ATLANTIC OCEAN, NORWEGIAN SEA, AND MEDITERRANEAN SEA, AREA 2, VOLUME 6, OCEANOGRAPHIC STATIONS AND VELOCITY PROFILES.
Final rept.
Texas Instruments Inc Dallas Science Services Div
19 Feb 68, 211p
NOO-SP-95-2-6
Contract N62306-1687

Descriptors: (*Marine geophysics, Atlantic Ocean), (*Oceanographic data, Mediterranean Sea), Hydrographic surveying, Underwater sound, Sound transmission, Velocity, Physical properties, Seawater, Ocean bottom sampling, Salinity, Temperature, Density, Clay, Samplers, Chemical properties, Underwater photography, Navigation charts, Norwegian Sea, Maps.
Identifiers: North Atlantic Ocean.

The report presents oceanographic data in Volume 6 Area 2. In addition to velocity profiles, the volume presents core physical properties, temperature-salinity plots and bottom photographs. Sound velocities computed from hydrographic data are compared to directly measured values. (Author)
AD-668 178 HC$3.00 MF$0.65

SURFACE MOORINGS. REVIEW OF PERFORMANCE.
Woods Hole Oceanographic Institution Mass
For primary bibliographic entry see Field 13M.
AD-668 217 HC$3.00 MF$0.65

TOPOGRAPHY AND HEAT FLOW OF THE FIJI PLATEAU,
Scripps Institution of Oceanography La Jolla Calif
For primary bibliographic entry see Field 8G.
AD-668 272 Not available from CFSTI.

TWO MAGNETIC AND BATHYMETRIC PROFILES ACROSS THE ATLANTIC OCEAN AND THE MID-ATLANTIC RIDGE.
Technical rept.,
Columbia Univ Dobbs Ferry N Y Hudson Labs
J. Brakl. Feb 68, 15p Rept no. TR-141
Contract Nonr-266 (84)

Descriptors: (*Marine geophysics, Atlantic Ocean), (*Hydrographic surveying, Atlantic Ocean), Ocean bottom sampling, Magnetic fields, Magnetic anomaly detection, Ocean bottom topography, Bermuda, Spain, Puerto Rico, Africa, Oceanographic vessels, Maps.
Identifiers: AGOR 1.

The bathymetric and geomagnetic results of two North Atlantic crossings between Bermuda and Rota, Spain and Puerto Rico and Dakar are presented and discussed. (Author)
AD-668 340 HC$3.00 MF$0.65

8K. Seismology

CRUSTAL STRUCTURE OF GREAT BRITAIN,
Durham Univ (England) Dept of Geology
For primary bibliographic entry see Field 8G.
AD-668 206 HC$3.00 MF$0.65

8L. Snow, Ice, and Permafrost

PROCEEDINGS OF THE ARCTIC BASIN SYMPOSIUM OCTOBER 1962.
Arctic Inst. of North America, Washington, D.C.
For primary bibliographic entry see Field 8F.
AD-441 307 HC$3.00

BRIDGE FOUNDATIONS IN PERMAFROST AREAS GOLDSTREAM CREEK, FAIRBANKS, ALASKA.
Cold Regions Research and Engineering Lab Hanover N H
For primary bibliographic entry see Field 13M.
AD-667 945 HC$3.00 MF$0.65

BREAKUP OF ICE, MEADE RIVER, ALASKA.
Special rept.,
Cold Regions Research and Engineering Lab Hanover N H
Philip L. Johnson, and Frank B. Kistner. Oct 67, 19p Rept no. CRREL-SR-118

Descriptors: (*Ice, Alaska), (*Hydrology, Alaska), Rivers, Thickness, Lakes, Atmospheric temperature, Periodic variations, Ecology, Dams, Aerial photographs, Floods, Predictions, Freezing, Heat, Inland waterways, Soils, Deposits, Sedimentation.
Identifiers: Summer (Season).

The climatic conditions and chronology of ice breakup on the Meade River, Alaska, in 1966 are reported and documented photographically. These observations and the interpretation of aerial photography suggest that ice damming, flooding, and dam release are the typical patterns of breakup that progress repetitiously downstream. The implications of ice breakup on plant succession on river bars and on channel erosion are discussed. (Author)
AD-667 946 HC$3.00 MF$0.65

SNOW ACCUMULATION STUDIES ON THE THULE PENINSULA, GREENLAND.
Research rept.,
Cold Regions Research and Engineering Lab Hanover N H
Steven J. Mock. Feb 68, 29p Rept no. CRREL-RR-238

Descriptors: (*Snow, Greenland), Volume, Mathematical prediction, Surface properties, Periodic variations, Environment, Ice islands, Thickness, Measurement, Regression analysis, Glaciers, Terrain, Moisture, Avalanches.

Data from stake measurements, marker boards and pits along a 136-km trail crossing the Thule Peninsula sector of the Greenland ice sheet have been used to determine both the regional and local distribution of snow accumulation. On a regional scale, trend surfaces of mean annual accumulation can be adequately predicted from a model using distance from moisture source and elevation as independent parameters. A series of steplike or wavelike features breaks the smooth profile of the ice sheet and causes profound changes in accumulation rates on a local scale. The accumulation pattern over these features can be predicted from surface slope and departure from regional elevation. Profiles of surface and subsurface topography indicate a direct relationship between subsurface hills and steplike features but cannot be quantitatively accounted for by existing ice flow theory. Detailed accumulation studies in conjunction with a program of spirit leveling in the vicinity of Camp Century have revealed the development of a shallow valleylike feature. Within this feature accumulation rates have increased, indicating that it is the result of flow phenomena. (Author)
AD-667 947 HC$3.00 MF$0.65

SOIL COMPACTION INVESTIGATION: REPORT 10. EVALUATION OF VIBRATORY ROLLERS ON THREE TYPES OF SOILS.
Technical memo.,
Army Engineer Waterways Experiment Station Vicksburg Miss
Jim W. Hall. Mar 68, 36p Rept no. AEWES-TM-3-271-10

Descriptors: (*Soils, Compressive properties), Vibrators (Mechanical), Road-building equipment, Thickness, Limestone, Classification, Sand, Clay, Effectiveness, Particle size, Moisture, Tables, Statistical analysis.
Identifiers: Graphs (Charts), *Vibratory rollers.

The study was conducted for the purpose of determining the ability of vibratory rollers to compact soils. For comparative purposes, a 50-ton rubber-tired roller was used which is a required compaction device in present Corps of Engineers Guide Specifications. Three vibratory rollers were selected for study based on their operating frequency which encompassed the range over which present vibratory rollers operate. Results of this study show that light vibratory rollers can obtain satisfactory densities if lift thicknesses are restricted. To evaluate the vibratory rollers, each was used to compact three soil types (a lean clay, a crushed limestone, and a clean sand). Results indicate that a heavy, low-frequency vibratory roller will compact to greater depths than a light, high-frequency roller; however, the light, high-frequency roller will compact soil satisfactorily for a few inches below the surface. Soil types have a very definite influence on results obtained with vibratory rollers. The vibratory rollers generally perform better in granular soils; however, the heavy, low-frequency type rollers do a satisfactory job in clay soils. (Author)
AD-667 966 HC$3.00 MF$0.65

THE SNOWY TORRENTS - AVALANCHE ACCIDENTS IN THE UNITED STATES, 1910-1966,
Alta Avalanche Study Center, Sandy, Utah.
Dale Gallagher. Jan 67, 147p
Prepared in cooperation with Forest Service, Washington, D. C.

Descriptors: (*Avalanches, *Accidents), (*Safety, Avalanches), United States, Weather, Terrain, Rescues, Casualties.
Identifiers: Snowy torrents, Avalanches (Snow).

The report is a compilation of avalanche accident summaries. The summaries give location, dates, weather factors, accident summary, rescue and comments.
PB-177 607 HC$3.00 MF$0.65

8M. Soil Mechanics

CBE FACTORS MONTHLY SURVEY NO. 24.
Library of Congress Washington D C Aerospace Technology Div
For primary bibliographic entry see Field 15B.
AD-668 075 HC$3.00 MF$0.65

TWO-DIMENSIONAL ANALYSIS OF STRESS AND STRAIN IN SOILS. REPORT 5. PLANE-STRAIN LOADING OF A STRAIN-HARDENING SOIL.
Research rept.,
Massachusetts Inst of Tech Cambridge Dept of Civil Engineering
Wilson H. Tang, and Kaare Hoeg. Mar 68, 81p
Rept nos. R68-4, Soils Pub-207
AEWES-CR-3-129-5
Contract DA-22-079-eng-471
See also AD-648 448.

Descriptors: (*Soil mechanics, Stresses), (*Strain (Mechanics), Soils), (*Nuclear explosions, *Underground structures), Loading (Mechanics), Plasticity, Numerical methods and procedures, Simulation, Interactions, Mathematical analysis, Explosion effects, Protection, Strain hardening, Response, Digital computers, Structural parts, Compressive properties.
Identifiers: Graphs (Charts).

The research is aimed at providing fundamental information on the degree to which modern numerical techniques and the theory of plasticity can be used to simulate actual soil response. It is hoped that the results, examined in the light of experimental data, can be used as a guide in assessing the validity of the application of these methods to more complicated soil-structure interaction and free field response computations being used in the analysis of the effects of nuclear weapons on underground protective structures. Based on recent

developments by Roscoe et al (1958) and others, idealized stress-strain relationships for a strain-hardening soil were formulated and discussed. The main objective of this report was to apply the suggested formulation to the simple physical situation of a strip footing in order to evaluate the assumptions used for the strain-hardening behavior. To perform the numerical computations, the soil continuum was replaced by a lumped parameter model, and the resulting algebraic equations were solved by a digital computer. Earlier work at Massachusetts Institute of Technology had developed a computer program for static plane strain analysis, and this report formulated a corresponding analysis for dynamic response. Then the study proceeded to use both these programs to determine the load-settlement curve for a strip footing. The last part of the report evaluates the proposed strain-hardening behavior and includes recommendations for modifications and future work. It is believed that the approach outlined represents a very useful method to improve current understanding of basic soil behavior. (Author)
AD-668 240 HC$3.00 MF$0.65

ENGINEERING PROPERTIES OF NUCLEAR CRATERS. REPORT 6. THEORETICAL STUDIES OF CRATERING MECHANISMS AFFECTING THE STABILITY OF CRATERED SLOPES, PHASE III.
Technical rept.,
Duke Univ Durham N C School of Engineering
Aleksandar S. Vesic, Gordon P. Boutwell, Jr., and Tien-Lie Tai. Mar 67, 140p
AEWES-TR-3-699-6
Contract DA-22-079-CIVENG-65-42
See also report no. 5, AD-651 746.

Descriptors: (*Cratering, Nuclear explosions), Soil mechanics, Explosion effects, Soils, Clay, Stability, Impact tests, Shale, Models (Simulations), Stresses, Sand, Tables, Detonation waves.
Identifiers: Cavities.

The third phase of the overall project is devoted to study of cratering phenomena in three specific situations that are of particular interest in engineering practice, namely: (1) the situation where the cratered medium is submerged under the water table; (2) the situation where the surface of the cratered medium is sloped; (3) the situation where several explosive charges are set off simultaneously in a medium. Thus, Chapter I is devoted to the experimental study of cratering phenomena in saturated or submerged media. Chapter II describes the experiments in which pore-fluid stress waves caused by an explosion in a mass of submerged, dense sand were measured and discussed, with particular emphasis on possible residual pore-fluid stresses. Chapter III is devoted to the problem of craters formed by explosions close to the sloped surface of a semi-infinite medium. Chapter IV deals with cratering phenomena caused by multiple charges, where coalescence of cavities may occur following detonation. (Author)
AD-668 247 HC$3.00 MF$0.65

SHEAR STRENGTH OF SOME HAWAIIAN LATOSOLS.
Technical rept.,
Iowa State Univ Ames Soil Research Lab
R. A. Lohnes, and R. L. Handy. 1968, 24p Rept nos. TR-7, Contrib-68-2
Contract Nonr-4868 (01)
Presented at Annual Symposium on Engineering Geology and Soil Engineering (6th) at Boise, Idaho, April 17, 1968. See also Technical report no. 2, AD-633 121.

Descriptors: (*Soil mechanics, Hawaii), Classification, Shear stresses, Internal friction, Kaolinite, Correlation techniques, Stability, Impregnation, Weight, Avalanches, Moisture, Decomposition, Drainage, Plasticity, Roads, Climatology, Test methods.
Identifiers: *Latosols, Oahu (Hawaii), Graphs (Charts), Cohesion, Seepage.

In situ shear strength measurements were made on three different soil series on the island of Oahu, Hawaii. Tests at depths between 2 and 3 ft indicate a low cohesion averaging about 0.6 psi and an angle of internal friction averaging about 25 degrees. Tests at about 3.5 ft depth gave the same internal friction angle but an appreciably higher cohesion. The kaolinite content determined from x-ray diffraction showed a positive correlation with cohesion. A slope stability analysis assuming saturation and seepage and using the average values of cohesion, internal friction, soil unit weight, and slope angle, resulted in a calculated depth to failure of 1.9 ft. This is close to the observed depth of slides described in the literature. At ordinary moisture contents, calculations indicate the slopes are stable. The increase in cohesion with depth precludes deep soil slides and is an argument for parallel slope retreat as a result of weathering. (Author)
AD-668 345 HC$3.00 MF$0.65

INSTRUMENTATION FOR SOIL MOTION STUDIES.
Air Force Special Weapons Center Kirtland AFB N Mex
For primary bibliographic entry see Field 18C.
AD-668 451 HC$3.00 MF$0.65

STUDY OF EMBANKMENT SETTLEMENT AND STABILITY FIELD OBSERVATIONS ON PROJECT I-80-9 (46), SALT LAKE CROSSING, LINCOLN.
Nebraska State Dept. of Roads. Div. of Materials and Tests.
16 Jun 67, 75p
Prepared in cooperation with Bureau of Public Roads, Washington, D. C.

Descriptors: (*Soils, Stability), Soil mechanics, Geology, Stratigraphy, Roads, Bituminous coatings, Tests, Nebraska, Analysis, Environmental tests, Structural properties.
Identifiers: Lincoln (Nebraska), Embankment.

The purpose of this investigation was to provide a background of information on highway embankment behavior. The study was initiated to determine by field measurement the following items: (1) The amount of settlement, (2) The rate of settlement, (3) And by field observation to observe the accuracy of the computed safety factors for embankment stability.
PB-177 377 HC$3.00 MF$0.65

SAND EQUIVALENT TEST INVESTIGATION OF PROCEDURAL MODIFICATIONS.
Final research rept.,
California State Div. of Highways. Materials and Research Dept.
Travis Smith, A. D. Hirsch, Charles A. Frazier, A. Y. Lee, and J. Vail. Jan 68, 18p M/R-632834
Prepared in cooperation with Bureau of Public Roads, Washington, D. C.

Descriptors: (*Soils, Environmental tests), Sand, Soil mechanics, Quality control, Aging (Materials), Moisture, Temperature control, Reliability, Civil engineering, Analysis.
Identifiers: Aggregates.

An evaluation of two proposed modifications to the sand equivalent test procedure is reported. Tests were randomly performed on samples with varying moisture contents and curing times. Testing was also done on identical samples at various temperatures. It was concluded that temperature changes affect each material differently but that all materials are affected predictably by a standardized moisture condition. It is recommended that ASTM use prescribed temperature limits and that alternate preparation methods, moist or oven-dried, be included in the test procedure. (BPR Abstract)
PB-177 887 HC$3.00 MF$0.65

8N. Terrestrial Magnetism

GEOMAGNETIC DATA BANGKOK, THAILAND - APRIL-JUNE 1966.
Geophysical data rept.,
Stanford Research Inst Menlo Park Calif
Douglas J. Barnes, and John Chapman. Jun 67, 17p
Contract DA-36-039-AMC-00040 (E), APRA Order-371
See also, AD-667 958.

Descriptors: (*Terrestrial magnetism, Thailand), Rubidium, Intensity, Diurnal variations, Magnetometers, Sensitivity, Magnetic fields, Spectrum signatures, Distribution, Digital systems, Mathematical analysis, Data processing systems, Tables.
Identifiers: Rubidium magnetometers.

Geomagnetic observations are being carried out at the Electronics Laboratory of the Military Research and Development Center, a joint Thailand-United States organization at Bangkok, Thailand. The data contained are obtained with a Varian V-4938A rubidium magnetometer. The data base is available in two forms: (1) the continuous magnetogram recording and (2) a digital printout every 2 minutes, both measuring the total geomagnetic field intensity. (Author)
AD-667 957 HC$3.00 MF$0.65

GEOMAGNETIC DATA: BANGKOK, THAILAND OCTOBER-DECEMBER 1966.
Geophysical data rept.,
Stanford Research Inst Menlo Park Calif
Douglas J. Barnes, and John Chapman. Dec 67, 17p
Contract DA-36-039-AMC-00040 (E), ARPA Order-371
See also AD-667 957.

Descriptors: (*Terrestrial magnetism, Thailand), Rubidium, Intensity, Diurnal variations, Magnetometers, Sensitivity, Magnetic fields, Spectrum signatures, Distribution, Digital systems, Mathematical analysis, Data processing systems, Tables.
Identifiers: Rubidium magnetometers.

Geomagnetic observations are being carried out at the Electronics Laboratory of the Military Research and Development Center, a joint Thailand-United States organization at Bangkok, Thailand. The data contained in bulletin are obtained with Rubidium Magnetometer. The data base is available in two forms: (1) the continuous magnetogram recording and (2) a digital printout every 2 minutes, both measuring the total geomagnetic field intensity. (Author)
AD-667 958 HC$3.00 MF$0.65

A PLANE-WAVE ANALOGUE MODEL FOR STUDYING ELECTROMAGNETIC VARIATIONS,
Victoria Univ (British Columbia)
H. W. Dosso. 1966, 15p
Availability: Published in Canadian Journal of Physics, v44 p67-80 1966.

Descriptors: (*Geophysical prospecting, Anomalies), (*Magnetic anomaly detection, Earth models), Earth (Planet), Surface properties, Periodic variations, Structural geology, Electrical conductance, Distribution, Equations, Frequency, Mathematical models, Partial differential equations, Correlation techniques, Cylindrical bodies, Concrete, Graphite.
Identifiers: Graphs (Charts).

A plane-wave analogue model for studying the effect that various geological structures have on the natural electromagnetic variations observed at the surface of the earth is discussed. The validity of the model is discussed, and measurements of amplitudes and phase angles are obtained for a model flat earth and for cylindrical bodies embedded in the surface layer. (Author)
AD-668 026 Not available from CFSTI.

CERTAIN PECULIARITIES OF MAGNETIC IONISPHERIC DISTURBANCES IN THE TRANSITION ZONE.
Foreign Technology Div Wright-Patterson AFB Ohio
E. P. Glushkova. 1 Sep 67. 25p Rept no. FTD-MT-24-160-67
Edited machine trans. of Issledovaniya Ionosfery i Meteorov: Sbornik Statei (USSR) n14 p104-16 1965.

Descriptors: (*Magnetic storms, Ionosphere), Ionospheric disturbances, Magnetic fields, Aurorae, Van Allen radiation belt, Periodic variations, Blackout (Electromagnetic), Polar regions, Measurement.
Identifiers: Translations, Transition zone.

The author discusses in detail peculiarities of magnetoionospheric disturbances in the transition zone: the upper limits in the Eastern Hemisphere are near 62 N and in the Western Hemisphere near 42 N, and the lower limits in the Eastern and Western Hemispheres are 55 N and 35 N, respectively and are located near the auroral zone. Observations covered the period extending mainly over the last months of 1958 and most of 1959 because the most complete data on ionospheric observations made with vertical soundings made available to the author covered this period. The article shows that during severe, very strong magnetic storms, Ds-variations of H and Z components of the geomagnetic field occur in synphases. Phenomena characteristic of the auroral-zone disturbances are observed in the ionosphere. Blackouts are observed only in cases during the positive phase of a storm when a sudden peak in the H component, warns of the approach of the current system to the observation point. Moreover, the negative phase of the storm should be well developed. As the transition zone is located approximately in the latitudes where the outer radiation belt is closest to the earth's surface, it is suggested that there may be connection between certain phenomena observed during magnetoionospheric disturbances and the movement of particles in the outer radiation belt. (Author)
AD-668 064 HC$3.00 MF$0.65

THE APPLICATION OF NUCLEAR MAGNETIC RESONANCE (YAMR) FOR DIFFERENTIAL MEASUREMENTS IN THE MAGNETIC FIELD OF THE EARTH.
Foreign Technology Div Wright-Patterson AFB Ohio
A. V. Melnikov. 21 Jul 67. 27p Rept no. FTD-MT-24-100-67
Edited machine trans. of Yadernyi Magnitnyi Rezonans (USSR) n1 p49-63 1965.

Descriptors: (*Terrestrial magnetism, Measurement), (*Nuclear magnetic resonance, Terrestrial magnetism), Magnetometers, Noise, Interference, Electromagnetic shielding, Errors, Transducers, Bessel functions, Magnetic anomaly detection, USSR.
Identifiers: Translations, Differential magnetometers.

The author discusses the principles for constructing systems to use the nuclear magnetic resonance method for differential measurements in the magnetic field of the earth and some of the physical problems involved in putting these systems into operation. The literature on differential magnetometers is reviewed and the problems of reducing inherent noises and shielding from external interference are considered. An approximate comparative evaluation is made of the freedom from interference in various differential magnetometers with the following simplifying assumptions: (1) the spectral density of the input noises for the equipment in the working frequency range is constant, (2) the noise factor for all systems is identical and is determined by the devices preceding the indicator. Some additional sources of error are discussed.
AD-668 160 HC$3.00 MF$0.65

ON THE KERATOPHYRE-SPILITIC FORMATION OF THE SOUTH-YENISEY MOUNTAIN RIDGE AND THE POSSIBLE NATURE OF THE KASSKAYA MAGNETIC ANOMALY.
Technical translation.
Aeronautical Chart and Information Center St Louis Mo Linguistic Section
E. B. Nalivkina. Feb 68. 11p
ACIC-TC-1351
Trans. of Geologiya i Geofizika (USSR). n1 p169-72 1965. tr. by Walter L. Burton.

Descriptors: (*Terrestrial magnetism, USSR), (*Structural geology, USSR), Magnetic fields, Magnetic anomaly detection, Mountains, Geologic age determination, Metamorphic rock, Quartz, Iron compounds, Ores (Metal sources), Deposits, Siberia, Igneous rock.
Identifiers: Translations, Rock (Pre-Cambrian).

The translation is of a work which drew the following conclusions: (1) The Yenisey metamorphic complex, or at any rate a considerable part of it, represents a metamorphized keratophyre-spilitic formation. (2) Ferrour quartzites are spatially and genetically connected with similar Pre-Cambrian formations of the world. (3) Rocks of the keratophyre-spilitic formation of Southern Yenisey ridge subside in a northwestern direction. These formations and higher horizons of the above-indicated formation obviously compose the Pre-Cambrian basement of the West-Siberian lowland in the region of the Kasskaya magnetic anomaly. (4) All that has been mentioned above indicates the possible occurrence of ferrons quartzites in the Pre-Cambrian foundation of the West-Siberian lowland in the region of the eastern part of the Kasskaya magnetic anomaly. (5) It is possible to assume that in Central Siberia there is located a basin of iron ore similar to that of the Kursk-Kriway Rag Basin. (Author)
AD-668 176 HC$3.00 MF$0.65

EVALUATION OF THE ACCURACY OF GRAVIMETRIC MAPS.
Technical translation.
Aeronautical Chart and Information Center St Louis Mo Linguistic Section
M. V. Avdulov. Feb 68. 21p
ACIC-TC-1363
Supersedes rept. no. ACIC-TC-833, dated Sep 64. Trans. of Prikladnaya Geofizika (USSR) n36 p167-80 1963. tr. by D. Shalikashvili.

Descriptors: (*Terrestrial magnetism, Maps), (*Magnetic anomaly detection, Accuracy), Gravity, Networks, Acceptability, Magnetic fields, Errors, Measurement, USSR.
Identifiers: Translations.

The accuracy of a map of gravity anomalies is understood to be the error in the determination of the anomaly at any point of the map, selected at random. The accuracy of a gravimetric map is determined by the error in the computations of the anomaly at the points of measurement and by the density of distribution of these points. This translation is a detailed analyzation of the problem of accuracy of gravimetric maps. Even though the suggested method of evaluation of accuracy was analyzed in connection with gravimetric problems, it can be used for the evaluation of the accuracy of maps compiled from magnetic survey data and in many cases a map compiled with the aid of a network of discrete values. (Author)
AD-668 177 HC$3.00 MF$0.65

ELECTRON CONTENT FLUCTUATIONS ASSOCIATED WITH A MAGNETIC STORM COMMENCING ON MAY 25, 1967.
Memorandum rept.,
Naval Research Lab Washington D C
John M. Goodman, Melvin W. Lehman, and Edward Piernik. Mar 68. 23p Rept no. NRL-MR-1858

Descriptors: (*Magnetic storms, Ionosphere), (*Communication satellites (Active), Radiofrequency interference), Very high frequency, Electron density, Periodic variations, Charged particles, Radio transmission, High frequency, Distribution, Scintillation, Polarization, Magneto-optic effect, Rotation, Measurement.
Identifiers: ATS-1 satellite.

VHF transmissions (137.350 MHz) from geostationary satellite ATS-1 (1966 110A) have been analyzed to determine the fluctuations in ionospheric electron content associated with magnetic storm No. 122 which began on May 25 (0735 EST) and ended on May 27 (0100 EST). Coincident with the advent of extremely disturbed propagation conditions in the HF band was an estimated increase in the ionospheric electron content of approximately 100 percent which occurred over a period of 90 minutes. This apparent increase in electron content during the positive phase of this large magnetic storm may be real and if so is in general consistent with the results of others. However, due to ray path obliguity, the possible effects of severe horizontal gradients and electronic redistribution upon the Faraday rotation measurements may distort the results to some extent. Severe amplitude scintillation occurred following the measured content excursion and its index was about 100 percent until midmorning. (Author)
AD-668 213 HC$3.00 MF$0.65

TOPOGRAPHY AND HEAT FLOW OF THE FIJI PLATEAU.
Scripps Institution of Oceanography La Jolla Calif
For primary bibliographic entry see Field 8G.
AD-668 272 Not available from CFSTI.

DETERMINATION OF THE COMPOSITION OF ROCKS OF THE PALEOZOIC BASEMENT ACCORDING TO CHARACTERISTIC PECULIARITIES OF THE ANOMALOUS MAGNETIC FIELD.
Aeronautical Chart and Information Center St Louis Mo Linguistic Section
For primary bibliographic entry see Field 8G.
AD-668 301 HC$3.00 MF$0.65

TWO MAGNETIC AND BATHYMETRIC PROFILES ACROSS THE ATLANTIC OCEAN AND THE MID-ATLANTIC RIDGE.
Columbia Univ Dobbs Ferry N Y Hudson Labs
For primary bibliographic entry see Field 8J.
AD-668 340 HC$3.00 MF$0.65

A CRITICAL STUDY OF THE POSSIBLE MODES OF PROPAGATION OF PI 2 MICROPULSATION ACTIVITY OVER THE EARTH'S SURFACE.
Royal Inst. of Tech., Stockholm (Sweden). Plasma Physics Div.
G. Rostoker. 1967. 24p REPT.-68-02
Conf- Presented At the Birkeland Symp., Sandefjord, Norway, Sep. 1967

Descriptors: *Earth surface, *Micropulsations, *Propagation modes, Auroral zones, Electromagnetic wave transmission, Energy transfer, Ionosphere, Magnetic anomalies, Magnetohydrodynamic waves, Magnetosphere, Night, Polarization (waves).

For abstract, see STAR 06 10.
N68-20227 HC$3.00 MF$0.65

9. ELECTRONICS AND ELECTRICAL ENGINEERING

9A. Components

RESEARCH AND DEVELOPMENT TO DESIGN, FABRICATE AND EVALUATE S.P.D.T. DRY-REED CAPSULES AND RELAYS USING THESE CAPSULES.
Quarterly progress rept. no. 1, 1 Apr-30 Jun 64,
General Reed Co., Metuchen, N. J.
A. Zeitz. 30 Jul 64. 40p
Contract DA-28-043-AMC-0059 (E)

Descriptors: (*Relays, Packaging), Performance (Engineering), Design, Tests, Test equipment (Electronics), Life expectancy, Sliding contacts, Resistance (Electrical), Voltage, Army research.

The purpose of this program is to obtain performance information on SPDU dry-reed capsules and to provide designs and performance information on relays using these capsules. Operating characteristics on an initial run of capsules is reported. Preliminary data is shown on levels, 1/4, 3/8, 1/2 and 3/4 amp., at cycling rate of 32 cpm. Fault sensor and load determining test circuits were developed and utilized.
AD-448 496 HC$3.00

RESEARCH AND DEVELOPMENT TO DESIGN, FABRICATE AND EVALUATE S.P.D.T. DRY-REED CAPSULES AND RELAY USING THESE CAPSULES.
General Reed Co., Metuchen, N. J.
For primary bibliographic entry see Field 9E.
AD-453 192 HC$3.00

INVESTIGATION OF ELECTRONIC INTERACTION WITH OPTICAL RESONATORS FOR MICROWAVE GENERATION AND AMPLIFICATION.
Report no. 10, 16 Jul-15 Nov 67,
Varian Associates Palo Alto Calif
H. Jory. Mar 68, 23p Rept no. 341-2-TriA
ECOM-01873-7
Contract DA-28-043-AMC-01873 (E)
Continuation of contract DA-28-043-AMC-00480 (E).

Descriptors: (*Resonators, Optical properties), (*Microwave oscillators, Design), Interactions, Microwave amplifiers, Electron tubes, Microwave equipment, Films, Efficiency, Mathematical analysis.

Additional experimental results with model 2 of the monotron oscillator are described. Oscillations were observed on resonances ranging from the TE sub 6,1,1 at 40.7 GHz to the TE sub 10,1,1 at 76 GHz. Peak power outputs of up to 25 W (not including a 3 dB factor for thermistor efficiency and insertion loss of waveguide components) have been measured. Some difficulty was encountered with a bad connection between the aluminum collector film and its kovar support. The tube was disassembled; a stainless steel mesh was installed as a beam collector, and the tube was reassembled. Detailed measurements of the rf output pulse shape were made. A rise time in the range of 5 to 10 nsec was observed. The possibility of constructing an oscillator for 337-micron wavelength (890 GHz) is investigated. Dielectric loading of the TE sub n,1,1 cavity with a thin film of dielectric on the cylindrical wall of the cavity appears to be a good approach for the circuit of such an oscillator. (Author)
AD-667 898 HC$3.00 MF$0.65

HIGH VOLTAGE BREAKDOWN STUDY.
Ion Physics Corp Burlington Mass
For primary bibliographic entry see Field 20C.
AD-667 904 HC$3.00 MF$0.65

RADIO 70 YEARS: COLLECTION ARTICLES.
Foreign Technology Div Wright-Patterson AFB Ohio
For primary bibliographic entry see Field 17B.
AD-667 925 HC$3.00 MF$0.65

LOW-POWER EXPLOSION OF THIN-FILM RESISTORS,
Harry Diamond Labs Washington D C
George K. Lucey, Jr. Jan 68, 25p Rept no. HDL-TR-1376

Descriptors: (*Resistors, Films), (*Electric detonators, Design), Measurement, Explosions, Heat transfer, Electric bridges, Temperature, Substrates, Firing circuits, Silicon.

An equation is derived that may be used in conjunction with experimental power measurements to determine the temperature at which a thin-film resistor is burned out. The objective of the analysis is to provide information that may be used to assist in the design of an inexpensive, match-like detonator activated by the heat generated in a thin-film resistor pulsed by a capacitor discharge system. (Author)
AD-667 949 HC$3.00 MF$0.65

STUDY OF METHODS TO IMPROVE HIGH POWER KLYSTRON LIFE AND RELIABILITY.
Rept. no. 4 (Final), 1 Jan-31 Dec 67,
Varian Associates Palo Alto Calif
John Brookshier. Feb 68, 72p Rept no. 346-1F
Contract DAAB07-67-C-0228
See also Report no. 3, AD-663 840.

Descriptors: (*Klystrons, Reliability (Electronics)), Cathodes (Electron tubes), Filaments, Thermal stresses, Waveguide windows, Electric arcs, Detectors, Plasma physics, Life expectancy, Propagation, Photoelectric cells (Semiconductor).

Studies were conducted in the following areas: Tests were conducted to measure the effects of thermal cycling and dc and ac steady-state operation upon the filament and mounting configuration of the cathode. Filament tie and focus electrode mounting were the main changes made. Studies were made to improve the ability of the windows on the present VA-876 klystron to withstand the effects of arcing in the rf waveguide of the system. The improved window consisted of various half-wave ceramic block windows. Studies were conducted to measure the feasibility of a solid-state arc protection system that would be less sensitive to extraneous line variations, and stable over a long period of time and temperature ranges. A solid-state arc detector of stable design was the result of this study. (Author)
AD-667 970 HC$3.00 MF$0.65

STUDIES OF INFRARED IMAGE CONVERTER (SOLID STATE TYPE AND VACUUM TYPE).
Progress rept.,
Matsushita Research Inst Tokyo Inc Kawasaki (Japan)
Koh-ichi Miyaji. Dec 67, 92p
ARDG (FE)-J-255-5
Contract DAJB17-67-C-0611

Descriptors: (*Image converters, Infrared images), Photoelectric materials, Cadmium selenides, Photosensitivity, Intermetallic compounds, Cadmium alloys, Mercury alloys, Tellurium alloys, Photoelectric effect, Photocathodes, Performance (Engineering), Electroluminescence, Phosphorescent materials, Infrared optical materials, Photoelectric cells (Semiconductor), Photodiodes, Silicon, Powder metals, Feedback.
Identifiers: *Solid state devices.

Theoretical and experimental studies were performed in an effort to obtain an infrared image converter. In Part I, the introduction of cooling has brought excellent results for improving the sensitivity of photoconducting CdSe powders. The optimum operating temperature in sensitivity was found 0C for both CdSe:Cu, Br and CdSe:Cu, Cl. As the result of a study on Cd1-xHgxTe powder, its operation for 1.5 microns in AC-DC system has become possible at low temperatures. In Part II, two systems, i.e., optoelectrical feedback and thick photoconductor systems, were proposed for the improvement in performance characteristic of the image converter. In the latter system, the minimum detectable input obtained was 6 x 10 to the minus 9th power w/sq cm. In Part III, main efforts were directed toward the improvement of the emission efficiency in Si photoemitter. The comparison of measured and calculated values for emission has been carried out. Measurements of energy distribution of the emitted electrons have also been made in this period. (Author)
AD-667 995 HC$3.00 MF$0.65

EFFECT OF ELECTRON IRRADIATION ON CARRIER MOBILITIES IN INVERSION LAYERS OF INSULATED GATE FIELD EFFECT TRANSISTORS.
Journal article,
Massachusetts Inst of Tech Lexington Lincoln Lab
Alan G. Stanley. 11 May 67, 11p Rept no. JA-2991
ESD-TR-68-33
Contract AF 19 (628)-5167
Availability: Published in IEEE Transactions on Nuclear Science, v14 n6 p266-75 December 1967.

Descriptors: (*Field effect transistors, Electron bombardment), Carriers (Semiconductors), Gates (Circuits), Voltage, Electrical conductance, Space charges, Scattering, Equations of motion.
Identifiers: *Metal oxide semiconductors.

The effect of 1.5 MeV and 20 keV electrons on the mobility was determined for a number of different types of n- and p-channel insulated gate field effect transistors with thermally grown oxide and deposited nitride passivation. An expression has been derived for the variation of the effective mobility with gate voltage as the result of surface scattering, which is in good agreement with values obtained from the channel conductance at 100 mV source to drain voltage. It is shown that the observed decrease in effective mobility after irradiation may be explained in terms of increased lattice scattering and Coulomb scattering by charged surface traps while the diffuse surface scattering remains unchanged. The channel conductance and transconductance of the devices were also measured in the saturation region. (Author)
AD-668 184 Not available from CFSTI.

FOUNDATIONS OF RELIABILITY AND OPERATION THEORY FOR RADIOELECTRONIC EQUIPMENT,
Foreign Technology Div Wright-Patterson AFB Ohio
For primary bibliographic entry see Field 14D.
AD-668 250 HC$3.00 MF$0.65

INVESTIGATION OF SOLID STATE DEVICES AND MATERIALS.
Final rept. 1 Sep 64-30 Sep 67,
Northeastern Univ Boston Mass
Basil L. Cochrun. 30 Sep 67, 77p
AFCRL-67-0685
Contract AF 19 (628)-4759

Descriptors: (*Semiconductor devices, Performance (Engineering)), Noise, Gain, Frequency, Electrical impedance, Surface properties, Manufacturing methods, Diodes (Semiconductor), Lasers, Infrared detectors, Circuits.
Identifiers: Small current amplifying devices, SCAD (Small Current Amplifing Device), Metal-semiconductor diodes, Graphs (Charts), *Solid state devices.

The investigations carried out under the terms of this contract consist of three principle areas of endeavor: the characterization of semiconductor devices in terms of gain, impedance, frequency response and noise and unique applications of these devices to circuitry; a study of semiconductor and metal-semiconductor junction parameters; a study of materials and fabrication techniques leading to more efficient diode lasers. (Author)
AD-668 437 HC$3.00 MF$0.65

ELEMENT DEVELOPMENT FOR ADVANCED ASSOCIATIVE MEMORIES.
Catholic Univ of America Washington D C
For primary bibliographic entry see Field 9B.
AD-668 473 HC$3.00 MF$0.65

PRESSURE SWITCH FOR DETECTION OF THRUSTER OPERATION OF LUNAR EXCURSION MODULE REACTION CONTROL SYSTEM FINAL REPORT.
Electro-optical Systems, Inc., Pasadena, Calif.
For primary bibliographic entry see Field 21H.
For abstract, see STAR 06 10.
N68-19701 HC$3.00 MF$0.65

9B. Computers

ON DISTRIBUTED COMMUNICATIONS. I. INTRODUCTION TO DISTRIBUTED COMMUNICATIONS NETWORKS,
RAND Corp., Santa Monica, Calif.
For primary bibliographic entry see Field 17B.
AD-444 830 HC$3.00

PROGRAMMABLE LOGIC ARRAYS, CHEAPER BY THE MILLIONS,
Stanford Research Inst Menlo Park Calif
Sven E. Wahlstrom. Jan 68, 12p Rept no. Scientific-4
AFCRL-68-0113
Contract AF 19 (628)-5828
Availability: Published in Electronics, p90-5 Dec 11 1967.

Descriptors: (*Logic circuits, *Integrated circuits), Computer logic, Control sequences, Electrical networks, Relaxation oscillators, Switching circuits, Circuit interconnections, Costs, Theory.
Identifiers: Large scale integrated circuits, Metal oxide semiconductors.

The concept of programmable logic arrays and networks is described and exemplified by a cell that is well adapted to the MOS technology. The networks are assembled from standard arrays produced in high volume. The array function is modified to meet the system needs by electronic programming. A sequence of programming signals is fed into the arrays, thereby selectively setting function control flip-flops. The function control flip-flop controls the functions in the cells of the array and also the interconnection cell-to-cell and cell-to-data-lines extending across the array and connecting to the array terminals. The dual use of the cell as a programming aid and as a functional element in the final system application is described. The economy of programmable arrays compared to customized arrays is discussed. Programmable arrays are most economic when less than a few hundred systems of a kind are produced; however, they can be economically justified for several thousand systems if inherent system flexibility, spare part standardization, and easy servicing are taken into account. (Author)
AD-667 894 Not available from CFSTI.

MEMORY ELEMENT FLIP-FLOP INPUT EQUATIONS.
Research and development technical rept.,
Army Electronics Command Fort Monmouth N J
David Haratz. Dec 67, 32p Rept no. ECOM-2927

Descriptors: (*Logic circuits, Algebras), Simultaneous equations, Design, Optimization, Theorems, Relaxation oscillators, Maps, Computer logic, Synthesis, Computer storage devices, Graphics.

A graphical method is described that is generally useful for solving a pair of simultaneous Boolean equations, particularly the system application equation and memory characteristic equation for determining the memory element flip-flop input equations. The decision mechanism utilized for determining the Karnaugh map structure from which an optimum solution may be obtained is based totally on the behavioral characteristics of the memory element as derived from a truth table. Simple illustrative examples are included for the R-S flip-flop (with variations in dominance), the J-K flip-flop and the R-S-T flip-flop encompassing various classes of 'don't care' conditions. (Author)
AD-667 903 HC$3.00 MF$0.65

ELECTROSTATIC FOCUSING OF HOLLOW SPIRALING ELECTRON BEAMS.
City Coll Research Foundation New York
For primary bibliographic entry see Field 20G.
AD-667 906 HC$3.00 MF$0.65

PARALLELISM IN COMPUTER PROGRAMS AND IN MACHINES.
Quarterly Technical rept. no. 6, 21 Oct 67-26 Jan 68,
Burroughs Corp Paoli Pa Defense Space and Special Systems Group
Harvey W. Bingham, and Earl W. Reigel. Apr 68, 32p Rept no. TR-68-1
ECOM-02463-6
Contract DA-28-043-AMC-02463 (E)

Descriptors: (*Digital computers, Multiple operation), (*Computer programs, Compilers), Sequences, Algorithms, Computer storage devices, Time, Costs, Programming languages, Flow charting, Programming (Computers), Selection, Integrated circuits.
Identifiers: Multiprocessing, Loops, Large scale integrated circuits.

A second method for partial order control using the results of the previously reported parallelism detection algorithm is given. A comparison in cost of representation and use is made among the two order control methods and sequential control. Parallelism among executions of loop bodies and among nested and interlocked loops is examined. A system design for parallelism exploitation is described. This system uses a block oriented random access memory (BORAM) for secondary storage to minimize access time. Some characteristics of dynamic sequencing procedures for selection among ready tasks are given. (Author)
AD-667 907 HC$3.00 MF$0.65

A DETECTOR ENERGY INTEGRATION PROGRAM DESIGNED TO OPERATE ON THE NGM CODE OUTPUT,
Army Nuclear Defense Lab Edgewood Arsenal Md
For primary bibliographic entry see Field 18C.
AD-667 933 HC$3.00 MF$0.65

EXEC 8 INPUT-OUTPUT INTERFACE FOR FORTRAN V.
National Resource Analysis Center Washington D C
Jan 68, 37p Rept no. NRAC-Technical Manual-206

Descriptors: (*Data processing systems, *Programming languages), (*Input-output devices, Magnetic recording systems), Subroutines, Magnetic tape, Specifications, Errors, Sequences, Digital computers, Programming (Computers).
Identifiers: FORTRAN.

This report is a description of the preliminary specifications including calling sequences for an input-output item handling system to interface between FORTRAN programs and the 1108 EXEC 8 data handling routines. It is intended that this interface provide to a FORTRAN program all the item handling capabilities that are available to an assembly program under EXEC 8 control, with some additional programming conveniences incorporated. (Author)
AD-667 952 HC$3.00 MF$0.65

ONE-LINE RANDOM NUMBER GENERATORS AND THEIR USE IN COMBINATIONS,
Boeing Scientific Research Labs Seattle Wash Mathematics Research Lab
For primary bibliographic entry see Field 12A.
AD-667 956 HC$3.00 MF$0.65

GEOMAGNETIC DATA BANGKOK, THAILAND - APRIL-JUNE 1966.
Stanford Research Inst Menlo Park Calif
For primary bibliographic entry see Field 8N.
AD-667 957 HC$3.00 MF$0.65

GEOMAGNETIC DATA: BANGKOK, THAILAND OCTOBER-DECEMBER 1966.
Stanford Research Inst Menlo Park Calif
For primary bibliographic entry see Field 8N.
AD-667 958 HC$3.00 MF$0.65

EOC DISPLAY SYSTEM EVALUATION.
System Development Corp Santa Monica Calif
For primary bibliographic entry see Field 15C.
AD-667 964 HC$3.00 MF$0.65

IMPLICATIONS OF SYMBOL USAGE ON U. S. ARMY MAPS FOR AN AUTOMATED CARTOGRAPHIC SYSTEM.
American Institutes for Research Pittsburgh Pa
For primary bibliographic entry see Field 8B.
AD-667 979 HC$3.00 MF$0.65

GENERAL METHOD FOR DETERMINING THE AERODYNAMIC CHARACTERISTICS OF FAN-IN-WING CONFIGURATIONS. VOLUME II. COMPUTER PROGRAM DESCRIPTION.
Boeing Co Renton Wash
For primary bibliographic entry see Field 1C.
AD-667 981 HC$3.00 MF$0.65

TECHNICAL APPENDICES TO IMPLICATIONS OF SYMBOL USAGE ON U. S. ARMY MAPS FOR AN AUTOMATED CARTOGRAPHIC SYSTEM.
American Institutes for Research Pittsburgh Pa
For primary bibliographic entry see Field 8B.
AD-667 986 HC$3.00 MF$0.65

ON-LINE ANALYSIS FOR SOCIAL SCIENTISTS.
Massachusetts Inst of Tech Cambridge
For primary bibliographic entry see Field 5K.
AD-668 009 HC$3.00 MF$0.65

THE OPTIMUM EXTENT OF ICP INVENTORY CONTROL.
Logistics Management Inst Washington D C
For primary bibliographic entry see Field 15E.
AD-668 019 HC$3.00 MF$0.65

COMBINED CALCULATING DEVICE,
Foreign Technology Div Wright-Patterson AFB Ohio
G. K. Krug, I. A. Sirmai, N. I. Chelnokov, and I. L. Tsvetaeva. 13 Sep 67, 11p Rept no. FTD-MT-24-240-67
Edited machine trans. of mono. Vychislitelnaya Tekhnika v Upravlenii, Moscow, 1966 p152-7.

Descriptors: (*Computers, *Coupling circuits), Digital computers, Analog computers, Data processing systems, USSR, Digital-to-analog converters, Analog-to-digital converters, Simulation, Control, Real time, Diagrams.
Identifiers: Translations.

It is noted that the computing capabilities of a combination of a digital computer and an analog computer connected by a communications unit considerably exceed the capabilities of the digital and analog devices taken separately. This combination is especially valuable for small computer centers which include one or two 'Ural'-type limited speed digital computers or a 'Minsk' and several MN-7 type or MNB analog computers. It is reported that the Problems Laboratory of Automation and Telemechanics and the computer center of the Moscow Power Institute have developed and constructed a combined computer system based on the 'Minsk-11' computer and an MNB type analog computer, using a universal connecting unit. A description of the individual segments of the system is presented.
AD-668 055 HC$3.00 MF$0.65

ANALOG DIGITAL MULTIPLIER WITH EXPANDED RANGE OF CODE FACTOR CHANGE,
Foreign Technology Div Wright-Patterson AFB Ohio

Group 9B—Computers

T. F. Bekmuratov, and V. P. Skuridin. 7 Jul 67, 13p Rept no. FTD-MT-24-140-67
Edited machine trans. of Akademiya Nauk Uzbekskoi SSR, Tashkent. Izvestiya. Seriya Tekhnicheskikh Nauk, n4 p27-30 1966.

Descriptors: (*Logic circuits, Analog-digital computers), Pulse systems, Delay circuits, Voltage, Accuracy, Time, Comparators, Diagrams, USSR.
Identifiers: Translations, *Analog-digital multipliers.

An analog-digital multiplier is presented. The factors to be multiplied are: (1) a binary coded quantity entered into the register and (2) a voltage level between 0 and 10 v. The product is given with an accuracy of plus or minus 0.2% at the 10-bit counter output.
AD-668 058 HC$3.00 MF$0.65

STEPS TOWARD A GENERAL PURPOSE TIME-SHARING SYSTEM USING LARGE CAPACITY CORE STORAGE AND TSS/360,
Carnegie-Mellon Univ Pittsburgh Pa Dept of Computer Science
Richard E. Fikes, Hugh C. Lauer, and Albin L. Vareha, Jr. Mar 68, 38p
AFOSR-68-0763
Contract SD-146
Prepared for presentation at the National Conference of Association for Computing Machinery, 1968.

Descriptors: (*Data storage systems, Time sharing), Information retrieval, Programming (Computers), Costs, Decision making, Cybernetics, Time, Algorithms, Flow charting, Correlation techniques.
Identifiers: *Large capacity core storage, TSS (Time Sharing System), *Time sharing systems.

This paper is a progress report of an effort at Carnegie-Mellon University to determine how a large capacity core storage facility (LCS) can be used to reduce the demand paging overhead costs in the IBM System/360 Time Sharing System (TSS/360) and in similar general purpose time-sharing systems. A discussion is presented of how the number of paging operations and the cost of each paging operation can be reduced by using LCS as both a swapping device and an extension of executable core. Two problems which arise are considered. A new algorithm for releasing core is presented and compared with two existing algorithms. Finally, results from a feasibility implementation of the ideas in a pre-release version of TSS/360 are presented as a demonstration of the validity of using LCS to reduce paging overhead. (Author)
AD-668 078 HC$3.00 MF$0.65

LANGUAGES, AUTOMATA AND CLASSES OF CHAIN-ENCODED PATTERNS.
New York Univ N Y Lab for Electroscience Research
For primary bibliographic entry see Field 5G.
AD-668 081 HC$3.00 MF$0.65

A METHODOLOGY FOR EVALUATING TIME-SHARED COMPUTER SYSTEM USAGE,
Carnegie-Mellon Univ Pittsburgh Pa Dept of Computer Science
Michael M. Gold. Aug 67, 151p
AFOSR-68-0795
Contracts SD-146, Nonr-4102 (01)

Descriptors: (*Digital computers, *Time sharing), Man-machine systems, Behavior, Performance (Engineering), Programming (Computers), Programming languages, Costs, Time, Learning, Feedback, Problem solving, Questionnaires, Data processing systems.
Identifiers: Methodology.

The development of time-shared computer systems has led to major technical and philosophical changes in the computer field in this decade. A large number of designers, manufactureres, and users of such systems have expended great amounts of effort in the development of the capabilities of the computer and the means to use it. However, little or no effort has yet been expended to evaluate these systems in terms of their usefulness for present or future customers. The research reported here has focused on the development of a methodology through which time-shared computer system usage can be evaluated. It is based on a study of the characteristics and design of present and proposed computer systems, as well as relevant behavioral theory and research. Five categories of variables are included in the resulting methodology, namely those which are measures of: (1) the cost of using the system; (2) the performance produced through the use of the computer system; (3) the speed with which results could be produced; (4) the amount of learning resulting from the use of the computer system; and (5) the attitudes of the users of the computer system. (Author)
AD-668 084 HC$3.00 MF$0.65

PROPERTIES OF CELLULAR ARRAYS FOR LOGIC AND STORAGE.
Final rept. 14 Jan 66-13 Oct 67,
Stanford Research Inst Menlo Park Calif Poulter Labs
Bernard Elspas, William H. Kautz, and Harold S. Stone. Nov 67, 61p
AFCRL-68-0005
Contract AF 19 (628)-5828

Descriptors: (*Computer logic, Circuits), Computer storage devices, Digital systems, Networks, Detectors, Modules (Electronics), Manufacturing methods, Mathematical analysis, Tables.

The report presents final results of a third project covering research on cellular logic techniques. The objective of the research has been to develop techniques for the efficient realization of general logical functions in cellular arrays. The report covers the subjects of cellular cascades and related networks; studies of universal logic modules; programmed-logic arrays; diagnosis and testing of cellular arrays; sampled-sequence detectors, serial universal logic modules, and iterative multirail cascades. (Author)
AD-668 085 HC$3.00 MF$0.65

APPLICATIONS OF BALANCED TREE SEARCH,
Rand Corp Santa Monica Calif
For primary bibliographic entry see Field 12B.
AD-668 119 HC$3.00 MF$0.65

COMPUTER TECHNOLOGY REPORT NO. 12,
Library of Congress Washington D C Aerospace Technology Div
Boris Doncov. Apr 68, 29p Rept no. ATD-68-18-87-2
Surveys of foreign scientific and technical literature. See also rept. AD-663 225.

Descriptors: (*Computers, USSR), (*Data processing systems, USSR), Reports, Digital computers, Diodes (Semiconductor), Control systems, Computer storage devices, Effectiveness, Data transmission systems, Integrated circuits, Abstracts, Graphics.

This is the twelfth in a series of reports reviewing Soviet developments in computer technology. Abstracts contained in the report were selected from Soviet open-source literature recently available at the Aerospace Technology Division and the Library of Congress. Information not directly related to the assigned subject has been included because of its broad implications for study in this field. The 17 abstracts are arranged alphabetically by author within each of the following categories: components, design, applications, and associated systems. (Author)
AD-668 126 HC$3.00 MF$0.65

DIGITAL ATTITUDE SIMULATION INPUTTOR DICTIONARY.
Johns Hopkins Univ Silver Spring Md Applied Physics Lab
For primary bibliographic entry see Field 22B.
AD-668 140 HC$3.00 MF$0.65

A DESCRIPTION OF THE DIGITAL ATTITUDE SIMULATION.
Johns Hopkins Univ Silver Spring Md Applied Physics Lab
For primary bibliographic entry see Field 22B.
AD-668 141 HC$3.00 MF$0.65

SPECIALIZED CALCULATING MACHINES FOR CALCULATION OF ECONOMIC DISTRIBUTION OF ACTIVE LOADS IN POWER SYSTEMS,
Foreign Technology Div Wright-Patterson AFB Ohio
For primary bibliographic entry see Field 10B.
AD-668 183 HC$3.00 MF$0.65

A PERMUTATION NETWORK,
Stanford Research Inst Menlo Park Calif
Abraham Waksman. 1967, 8p
Contract Nonr-4833 (00)
Availability: Published in Journal of the Association for Computing Machinery, v15 n1 p159-63 Jan 1968.

Descriptors: (*Switching circuits, Permutations), (*Logic circuits, Design), (*Computers, Design), Relaxation oscillators, Set theory, Combinatorial analysis, Algorithms, Theorems.
Identifiers: *Permutation networks, Circuit theory.

The construction of a switching network capable of n factorial-permutation of its n input terminals to its n output terminals is described. The building blocks for this network are binary cells capable of permuting their two input terminals to their two output terminals. The number of cells used by the network is (n log to the base 2 of n - n+1) = Summation from k=1 to k-n of the quantity (log to the base 2 of k). It could be argued that for such a network this number of cells is a lower bound, by noting that binary decision trees in the network can resolve individual terminal assignments only and not the partitioning of the permutation set itself which requires only (log to the base 2 of n factorial) = (Summation from k=1 to k=n of the quantity log to the base 2 of k) binary decisions. An algorithm is also given for the setting of the binary cells in the network according to any specified permutation. (Author)
AD-668 205 Not available from CFSTI.

HIGH-INFORMATION-DENSITY STORAGE SURFACES.
Quarterly rept. no. 11, 1 Oct-31 Dec 67,
Stanford Research Inst Menlo Park Calif
Kendal T. Rogers, Donald R. Cone, and Louis N. Heynick. Mar 68, 32p
ECOM-01261-11
Contract DA-28-043-AMC-01261 (E)
See also AD-665 634.

Descriptors: (*Data storage systems, *Microminiaturization (Electronics)), (*Thin film storage devices, Sandwich construction), Capacitors, Dielectric films, Electron beams, Vacuum apparatus, Storage tubes, Electron guns, Metal films, Molybdenum, Etching, Sputtering, Argon, Electron multipliers, Siloxanes, Metalorganic compounds, Acrylic resins, Computer programs.
Identifiers: Protective coatings, Computer aided design.

This program is devoted to the preparation and investigation of two novel kinds of electron-beam-addressable storage elements of submicron size and densely packed arrays of these elements; also to the construction of a large-capacity, high-speed, electron-beam-addressable, data-storage system

utilizing regular arrays of these elements. Work on storage mosaics was devoted to further development of techniques for the preparation of regular arrays of densely packed micro-cap elements including: investigations of other resists besides tetrakistriphenyl siloxytitanium, such as KPR, Shipley's AZ 111, and poly (methyl metharcrylate); argon-ion sputtering of molybdenum films; and lead-fluoride etching of aluminum-oxide films. Appropriate combinations of these techniques appear promising. The development of a computer program for the design of electron-optical systems capable of scanning 100,000,000 elements per field for mosaic fabrication and for element address is continuing. Concurrently, the present molybdenum-lens electron-optical system is being reassembled to include a velocity-selector/electron-multiplier readout unit and a bakeout heater. (Author)
AD-668 242 HC$3.00 MF$0.65

A DIGITAL COMPUTER FOR THE ELECTRONIC MUSIC STUDIO,
Illinois Univ Urbana Biological Computer Lab
M. David Freedman. Jan 67, 10p Rept no. Publ-143
AFOSR-68-0776
Grant AF-AFOSR-7-66
Prepared in cooperation with Bendix Research Labs., Southfield, Mich.
Availability: Published in Journal of the Audio Engineering Society, v15 n1 Jan 1967.

Descriptors: (*Music, *Digital computers), Data processing systems, Data storage systems, Input-output devices, Magnetic tape, Analog-to-digital converters, Sound, Synthesis, Real time, Acoustics.

Recent advances in computer technology have made it feasible to use digital computers as musical instruments. This paper presents a set of specifications for a digital computer system which can be used for the analysis, synthesis and editing of music. Details are presented for several music synthesis schemes, and the possibility of realizing these schemes in real time is investigated. (Author)
AD-668 308 Not available from CFSTI.

ANALYSIS OF MUSICAL INSTRUMENT TONES,
Illinois Univ Urbana
M. David Freedman. Apr 67, 17p
AFOSR-68-0775
Grant AF-AFOSR-7-66
Availability: Published in The Journal of the Acoustical Society of America, v41 n4 p793-806 April 1967.

Descriptors: (*Music, *Digital computers), Data processing systems, Analog-to-digital converters, Sound, Synthesis, Acoustics, Frequency, Mathematical analysis.
Identifiers: Musical instruments.

A technique is presented for the analysis of musical instrument tones. The end result is a mathematical representation for the tone being investigated. Since no assumptions are made about the frequencies of the partial tones, inharmonic frequencies can be detected and accounted for in the representation. An analog-digital converter was used to present the signals to the ILLIAC II digital computer for analysis. Five tones were analyzed, resynthesized, and subjected to listening tests. The trumpet tone was characterized by a frequency change which, if omitted during synthesis, made the tone sound mechanical. The saxophone tone had a short-duration, inharmonic component which gave it the 'bite' characteristic of a jazz tone. The other tones analyzed were produced by a violin, bassoon, and clarinet; and each, when resynthesized, still retained the tonal quality of the original; as examples, the wind tones sounded breathy and the violin sounded bowed. It was thus concluded that this analysis technique can be successfully applied to analyzing tones of the classes of instruments represented by these five tones. (Author)
AD-668 309 Not available from CFSTI.

QUARTERLY TECHNICAL PROGRESS REPORT OCTOBER, NOVEMBER, DECEMBER 1967.
Illinois Univ Urbana Dept of Computer Science
1967, 276p
Contract Nonr-1834 (15)

Descriptors: (*Digital computers, Scientific research), (*Computer programs, Scientific research), (*Pattern recognition, Digital computers), Logic circuits, Integral transforms, Analog-to-digital converters, Programming languages, Graphics, Flow charting, Programming (Computers), Data processing systems, Problem solving, Time sharing, Microfiche.
Identifiers: Illiac computer.

Contents: Circuit research program; Hardware systems research; Software systems research program; Illinois pattern recognition computer (Illiac III); Illiac IV; Numerical methods, computer arithmetic and artificial languages; Computational physics; Switching theory and logical design; Illiac II service, use, and program development; IBM 7094/1401 service, use, and program development; Problem specifications; and General department information.
AD-668 321 HC$3.00 MF$0.65

A COMPUTER PROGRAM FOR THE NUMERICAL SOLUTION OF HYPERBOLIC PARTIAL DIFFERENTIAL EQUATIONS BY THE METHOD OF CHARACTERISTICS,
Naval Ordnance Lab White Oak Md
For primary bibliographic entry see Field 12A.
AD-668 324 HC$3.00 MF$0.65

THE USE OF NUMERICALLY CONTROLLED MACHINE TOOLS IN R.A.E. WORKSHOPS.
Royal Aircraft Establishment Farnborough (England)
For primary bibliographic entry see Field 13H.
AD-668 352 HC$3.00 MF$0.65

A 201A DATA COMMUNICATION ADAPTOR FOR THE PDP-8: PRELIMINARY ENGINEERING DESIGN REPORT,
Michigan Univ Ann Arbor
David E. Wood. Feb 68, 155p Rept no. Memo-15
Contract DA-49-083-OSA-3050, ARPA Order-716
See also AD-667 655. Rept. on Proj. CONCOMP.

Descriptors: (*Data transmission systems, Digital computers), (*Digital computers, Interfaces), Design, Logic circuits, Diagrams, Multiplex, Gates (Circuits), Synchronization (Electronics), Interrupters, Transistors.
Identifiers: PDP-8 computers.

This report discusses the design and use of equipment built for data communication to and from a PDP-8 through a 201A data set. The purpose of the data communication interface is to allow a PDP-8 to send and receive digital data through a 201A data set in half-duplex mode. Basic design objectives and decisions are described first. A brief overall system description together with a sketch of a data format scheme and programming considerations is followed by a detailed description of the interface logic. (Author)
AD-668 384 HC$3.00 MF$0.65

AUTOMATIC GENERATION OF TAYLOR COEFFICIENTS (TAYLOR), FOR THE CDC 1604.
Wisconsin Univ Madison Mathematics Research Center
For primary bibliographic entry see Field 12A.
AD-668 397 HC$3.00 MF$0.65

NUMERICAL SOLUTION OF ORDINARY DIFFERENTIAL EQUATIONS BY SPLINE FUNCTIONS (SPLINDIF).
Wisconsin Univ Madison Mathematics Research Center
For primary bibliographic entry see Field 12A.
AD-668 400 HC$3.00 MF$0.65

DESCRIPTION OF A SET-THEORETIC DATA STRUCTURE.
Technical rept.,
Michigan Univ Ann Arbor
David L. Childs. Mar 68, 28p Rept no. TR-3
Contract DA-49-083-OSA-3050, ARPA Order-716
Rept. on Proj. CONCOMP. See also AD-667 655.

Descriptors: (*Data processing systems, *Information retrieval), (*Data storage systems, *Set theory), Combinatorial analysis, Programming languages, Programming (Computers), Digital computers, Data, Time, Operators (Mathematics).
Identifiers: Set theoretic data structure, Associative processor.

A set-theoretic data structure (STDS) is virtually a 'floating' or pointer-free structure allowing quicker access, less storage, and greater flexibility than fixed or rigid structures that rely heavily on internal pointers or hash-coding, such as 'associative or relational structures,' 'list structures,' 'ring structures,' etc. An STDS relies on set-theoretic operations to do the work usually allocated to internal pointers. A question in an STDS will be a set-theoretic expression. Each set in an STDS is completely independent of every other set, allowing modification of any set without perturbation of the rest of the structure; while fixed structures resist creation, destruction, or changes in data. An STDS is essentially a meta-structure, allowing a question to 'dictate' the structure or data-flow. A question establishes which sets are to be accessed and which operations are to be performed within and between these sets. In an STDS there are as many 'structures' as there are combinations of set-theoretic operations; and the addition, deletion, or change of data has no effect on set-theoretic operations, hence no effect on the 'dictated structures.' Thus in a floating structure like an STDS the question directs the structure, instead of being subservient to it. (Author)
AD-668 404 HC$3.00 MF$0.65

COMPUTERS AND INFORMATION FLOW,
Rand Corp Santa Monica Calif
R. L. Patrick. Mar 68, 18p Rept no. P-2791-1

Descriptors: (*Digital computers, Reviews), Input-output devices, Computer storage devices, Programming (Computers), Compilers, Computer personnel, Costs, Accuracy, Processing, Real time, Control systems, Command + control systems, Scheduling, Inventory control.
Identifiers: On-line systems.

The purpose is to provide a general introduction to the field, to pin down its unique terminology and jargon, to identify the various types of computers and the scope of computational capabilities, and to provide some rules of thumb which can be applied in determining whether a need for such a capability exists or not. (Author)
AD-668 417 HC$3.00 MF$0.65

DEVELOPMENT OF HIERARCHICAL GRAPHICAL LOGICAL ENTITY CAPABILITIES: DISPLAY SYSTEM OPERATOR'S MANUAL.
Final rept. (Part 1), Apr 65-Jan 68,
Adams Associates Inc Bedford Mass
Edward N. Chase, and David A. Westlake. 15 Feb 68, 85p

AFCRL-68-0130
Contract AF 19 (628)-5098

Descriptors: (*Graphics, *Data processing systems), (*Display systems, Graphics), Man-machine systems, Input-output devices, Mechanical drawing, Geometric forms, Colors, Computer operators, Instruction manuals, Programming (Computers).

Developed as a general-purpose program for the computer entry and manipulation of hierarchically-structured graphical information, the DX-1 Display System utilizes a drum-buffered scope, light pen and pushbutton box to provide the console user with the ability to draw charts, diagrams, curves, etc., on the face of the display scope. The drawings contain information which is reduced to a condensed digital format called an Entity Table. This table can then be manipulated by the use of special-purpose software during the drawing action. Graphical information generated by either console user or a conversational-mode computational program can also be displayed in full color. (Author)
AD-668 425 HC$3.00 MF$0.65

DEVELOPMENT OF HIERARCHICAL GRAPHICAL LOGICAL ENTITY CAPABILITIES: ENTITY TABLE DESIGN.
Final rept. (Part 2), Apr 65-Jan 68,
Adams Associates Inc Bedford Mass
Edward N. Chase, and David A. Westlake. 15 Feb 68, 38p
AFCRL-68-0128
Contract AF 19 (628)-5098

Descriptors: (*Graphics, *Data processing systems), (*Display systems, Graphics), Digital computers, Computer logic, Computer storage devices, Input-output devices, Programming (Computers), Geometric forms, Colors, Computer operators, Instruction manuals, Design, Man-machine systems.

A multilevel graphical data structure for an 18-bit digital computer is described. Graphical entities defined by the data structure may be linked together by a ring structure, logically tied coordinates, or other independent parameters. The structure is ideally suited for use with a large, delayed-access, mass-storage device, as the displayed picture representing the graphical entities can be generated independently of their logical linking. (Author)
AD-668 426 HC$3.00 MF$0.65

DEVELOPMENT OF HIERARCHICAL GRAPHICAL LOGICAL ENTITY CAPABILITIES: TIME-SHARING INPUT-OUTPUT EXECUTIVE (10X) PROGRAMMER'S MANUAL.
Final rept. (Part 3), Apr 65-Jan 68,
Adams (Charles W) Associates Inc Bedford Mass
Edward N. Chase, and David A. Westlake. 15 Feb 68, 97p
AFCRL-68-0131
Contract AF 19 (628)-5098

Descriptors: (*Graphics, *Data processing systems), (*Display systems, Graphics), Time sharing, Digital computers, Computer operators, Computer programs, Input-output devices, Colors, Computer logic, Programmers, Instruction manuals, Man-machine systems.

A special-purpose time-sharing executive program for the PDP-1 computer is described. Input-output transfers, multiple-user operation, inter-user communication and inter-module transfers are interpreted and performed by the executive program. Although the program reflects the hardware configuration of the Dynamic Experimental Processor (DX-1), the techniques used are applicable to other similarly-configured computer systems. (Author)
AD-668 427 HC$3.00 MF$0.65

DEVELOPMENT OF HIERARCHICAL GRAPHICAL LOGICAL ENTITY CAPABILITIES: DISPLAY SYSTEM PROGRAM MANUAL.
Final rept. (Part 5), Apr 65-Feb 68,
Adams Associates Inc Bedford Mass
Edward N. Chase, and David A. Westlake. 15 Feb 68, 303p
AFCRL-68-0129
Contract AF 19 (628)-5098

Descriptors: (*Graphics, *Data processing systems), (*Di play systems, Graphics), Computer programs, Computer logic, Input-output devices, Computer storage devices, Man-machine systems, Programming (Computers), Instruction manuals.

The programs of the DX-1 Display System are documented. Descriptions include program functions, calling and exiting sequences, common storage registers, logic of operation, and program listings. (Author)
AD-668 428 HC$3.00 MF$0.65

FORMULA ALGOL MANUAL,
Carnegie-Mellon Univ Pittsburgh Pa
Jay Earley. 26 Jun 67, 131p
AFOSR-68-0856
Contract SD-146

Descriptors: (*Programming languages, Instruction manuals), Compilers, Algorithms, Syntax, Semantics, Algebras, Functions, Sequences, Errors.
Identifiers: ALGOL.

Formula Algol is an extension of Algol 60 incorporating formula manipulation and list processing. This manual describes the use of the version of Formula Algol which is presently running at Carnegie-Mellon University. (Author)
AD-668 464 HC$3.00 MF$0.65

ELEMENT DEVELOPMENT FOR ADVANCED ASSOCIATIVE MEMORIES.
Final rept. Mar 66-Jan 68,
Catholic Univ of America Washington D C
Charles F. Pulvari, Noemi Szabo, Melvin J. Walsh, Jr., Antonio de la Paz, and William B. Penzes. Apr 68, 137p
RADC-TR-68-105
Contract AF 30 (602)-3717

Descriptors: (*Data storage systems, Capacitors), (*Capacitors, Performance (Engineering)), Computer storage devices, Logic circuits, Feasibility studies, Power, Costs, Effectiveness, Integrated circuits, Printed circuits, Ferroelectric materials, Bismuth, Oxides, Manufacturing methods, Noise, Switching circuits, Punched cards, Symbols.
Identifiers: *Ferrielectrics, Transpolarizers.

The objective of this research was to demonstrate that capacitor elements comprising the mixed bismuth oxide type ferrielectrics as a dielectric represent an important improvement as compared to ordinary ferroelectric capacitors and they can be utilized as logic and memory devices. (Author)
AD-668 473 HC$3.00 MF$0.65

ANL-CANDID A TWO-DIMENSIONAL, DIFFUSION-THEORY CODE BASED ON CANDID2D,
Argonne National Lab., Ill.
For primary bibliographic entry see Field 18K.
For abstract, see NSA 22 08.
ANL-7305 HC$3.00 MF$0.65

THE PACIFIC NORTHWEST LABORATORY HYBRID COMPUTER SYSTEM,
Battelle-Northwest, Richland, Wash. Pacific Northwest Lab.
For primary bibliographic entry see Field 18I.
For abstract, see NSA 22 08.
BNWL-538 HC$3.00 MF$0.65

2DB A TWO DIMENSIONAL DIFFUSION-BURNUP CODE FOR FAST REACTOR ANALYSIS,
Battelle-Northwest, Richland, Wash. Pacific Northwest Lab.
W. W. Little, Jr., and R. W. Hardie. Jan 68, 119p
Contract AT (45-1)-1830

Descriptors: (*Nuclear reactors, *Programming (Computers)), Mathematical models, Absorption, Energy, Data storage systems, Analysis, Mathematical analysis, Subroutines, Nuclear cross sections, Programming languages.
Identifiers: FORTRAN, Burnup.

For abstract, see NSA 22 08.
BNWL-640 HC$3.00 MF$0.65

MACS J. A PROGRAM FOR COMPUTING CRYSTAL PHONON DISPERSION RELATIONS, STRUCTURE FACTORS FOR NEUTRON INELASTIC SCATTERING, AND JACOBIAN MATRICES,
Idaho Nuclear Corp., Idaho Falls.
For primary bibliographic entry see Field 20H.
For abstract, see NSA 22 08.
IN-1147 HC$3.00 MF$0.65

CENTRAL RECORD OF COMPUTER PROGRAMS,
Joint Publications Research Service, Washington, D. C.
Erno Simon. 11 Jan 68, 11p
Trans. of Informacio Elektronika (Hungary) n4 p313-6 1967.

Descriptors: (*Computers, Hungary), Bibliographies, Machine translation, Subroutines, Input-output devices, Data processing systems, Statistical analysis, Linguistics, Computer programs, Programming languages.
Identifiers: PERT.

Technical programs: Test program; Translation program; Other technical programs; Systems planning and organization; Programs utilizing mathematical methods; Other programs.
JPRS-43979 HC$3.00 MF$0.65

ELAS - A GENERAL PURPOSE COMPUTER PROGRAM FOR THE EQUILIBRIUM PROBLEMS OF LINEAR STRUCTURES. VOLUME 1 - USER'S MANUAL.
Jet Propulsion Lab., Calif. Inst. of Tech., Pasadena.
For primary bibliographic entry see Field 20K.
For abstract, see STAR 06 10.
N68-19515 HC$3.00 MF$0.65

PROPOSED METHOD FOR GENERAL PROGRAMMING OF A SINGLE COMPUTER FOR PRE-LAUNCH CHECK-OUT.
European Space Vehicle Launcher Development Organization, Paris (France). Engineering Coordination Div.
For primary bibliographic entry see Field 22D.
For abstract, see STAR 06 10.
N68-20395 HC$3.00 MF$0.65

USE OF A DIGITAL COMPUTER FOR PRE-LAUNCH CHECKOUT OF THE ELDO-A VEHICLE.
European Space Vehicle Launcher Development Organization, Paris (France). Engineering Coordination Div.
For primary bibliographic entry see Field 22D.
For abstract, see STAR 06 10.
N68-20396 HC$3.00 MF$0.65

ORVAC-TF A FORTRAN CODE FOR THE CALCULATION OF A DESALINATION PLANT INCORPORATING A VAPOR COMPRESSOR SYSTEM TOPPING AN MSF PLANT,

Oak Ridge National Lab., Tenn.
For primary bibliographic entry see Field 7A.
For abstract, see NSA 22 08.
ORNL-TM-2006 HC$3.00 MF$0.65

O5S A MONTE CARLO CODE FOR CALCULATING PULSE HEIGHT DISTRIBUTIONS DUE TO MONOENERGETIC NEUTRONS INCIDENT ON ORGANIC SCINTILLATORS,
Oak Ridge National Lab., Tenn.
R. E. Textor, and V. V. Verbinski. Feb 68, 222p
Contract W-7405-eng-26

Descriptors: (*Programming (Computers), Monte Carlo method), Neutrons, Scintillation counters, Neutron detectors, Light, Pulse height analyzers, Distribution, Energy, Nuclear particles, Interactions, Subroutines, Flow charting, Tables.

For abstract, see NSA 22 08.
ORNL-4160 HC$3.00 MF$0.65

NCDATA - NUCLEAR COLLISION DATA FOR NUCLEON-NUCLEUS COLLISIONS IN THE ENERGY RANGE 25 TO 400 MeV,
Oak Ridge National Lab., Tenn.
For primary bibliographic entry see Field 20H.
For abstract, see NSA 22 08.
ORNL-4220 HC$3.00 MF$0.65

GRADE COMPUTER PROGRAM FOR CALCULATING URANIUM ORE RESERVES,
Grand Junction Office (AEC), Colo. Production Evaluation Div.
For primary bibliographic entry see Field 8G.
For abstract, see NSA 22 08.
RME-145 HC$3.00 MF$0.65

OPTIMUM SAMPLING METHODS.
Final rept.,
Oklahoma State Univ., Stillwater. School of Electrical Engineering.
Arthur M. Breipohl, John C. Hooker, and William C. McCormick, Jr. Aug 67, 108p
Contract 55-5520 (B)

Descriptors: (*Dynamic programming, Statistical analysis), Stochastic processes, Mathematical models, Computer programs, Digital computers, Sequential analysis, Probability, Operations research.
Identifiers: FORTRAN.

For abstract, see NSA 22 08.
SC-CR-67-2752 HC$3.00 MF$0.65

OPTIMIZATION STUDY OF CIRCUIT CARD DESIGN,
Thomas Bede Foundation, Los Altos, Calif.
John Ulrich, and Laura Cameron Ulrich. Dec 67, 64p
Contract 72-3058

Descriptors: (*Digital computers, Design), Programming (Computers), Automation, Optimization, Computer logic, Mathematical analysis, Circuits.
Identifiers: Circuit cards, Computer aided design.

For abstract, see NSA 22 08.
SC-CR-67-2862 HC$3.00 MF$0.65

BASIC LANGUAGE COMPUTER PROGRAM FOR CALCULATING INTERPLANAR SPACINGS,
Union Carbide Corp., Oak Ridge, Tenn. Y-12 Plant.
For primary bibliographic entry see Field 20B.
For abstract, see NSA 22 08.
Y-1603 HC$3.00 MF$0.65

9C. Electronic and Electrical Engineering

DEVELOPMENT OF ELEVATION SERVOMECHANISM, TI.
Pittsburgh Univ., Pa.
For primary bibliographic entry see Field 19C.
AD-452 148 HC$3.00

INTERPRETATION AND APPLICATION OF TRANSIENT AND IMPULSE RESPONSE APPROXIMATIONS IN ELECTROMAGNETIC SCATTERING PROBLEMS.
Doctoral thesis,
Ohio State Univ Columbus Electroscience Lab
David L. Moffatt. 27 Mar 68, 228p Rept nos. Scientific-1, 2415-1
AFCRL-67-0690
Contract F19628-67-C-0239

Descriptors: (*Electromagnetic fields, Scattering), (*Voltage, Response), (*Transients, Response), Linear systems, Mathematical analysis, High frequency, Mathematical models, Geometry, Physical properties, Perturbation theory, Spheres, Backscattering, Cylindrical bodies, Approximation (Mathematics), Theses, Rayleigh scattering.
Identifiers: Waveforms.

A linear system analysis is applied to electromagnetic scattering problems. The relationship between the incident and scattered fields is reduced to a one-dimensional linear system by suitable restrictions, and modeled as a linear two-port with time-invariant parameters. The two-port characterized by a real, time-dependent impulse response function and a transform-related complex, frequency-dependent phasor response. Two fundamental approaches for obtaining approximate solutions to electromagnetic scattering problems are seen. Estimates of either the frequency-dependent phasor response or the time-dependent impulse response can be attempted. The material in this study is concerned with the latter approach. (Author)
AD-668 124 HC$3.00 MF$0.65

PROPERTIES OF GENERALIZED ROOT-LOCI.
Die Eigenschaften Verallgemeinerter Wurzelortskurven
Scripta Technica, Inc., Washington, D. C.
G. Grubel, and L. Schmieder. Mar 68, 16p
NASA-TT-F-11516, DLR-FB-67-68
Contract NASW-1694
Refs Transl. Into English of Dlr-fb-67-68 Rept.

Descriptors: *Loci, *Mapping, *Points (mathematics), *Roots of equations, Algebra, Euclidean geometry, Functional analysis, Numerical analysis, Symmetry.

For abstract, see STAR 06 10.
N68-19790 HC$3.00 MF$0.65

AN ANNOTATED BIBLIOGRAPHY OF COMPUTER-AIDED CIRCUIT ANALYSIS AND DESIGN.
National Aeronautics and Space Administration. Langley Research Center, Langley Station, Va.
C. W. Meissner, Jr., 1968, 44p NASA-SP-7023

Descriptors: *Bibliographies, *Computerized design, *Network analysis, Annotations, Computers.

For abstract, see STAR 06 10.
N68-19882 HC$3.00 MF$0.65

RESEARCHES IN OPTIMAL AND SUBOPTIMAL CONTROL THEORY.
California Univ., Los Angeles. Dept. of Engineering.
G. Kang. Mar 68, 93p NASA-CR-93737, REPT.-68-10
Grant NSG-237-62

Descriptors: *Bellman theory, *Optimal control, *Pontryagin principle, *Regression coefficients, Approximation, Bibliographies, Iterative solution, Linear systems, Mathematical models, Problem solving.

For abstract, see STAR 06 10.
N68-20291 HC$3.00 MF$0.65

VERNIER CALIPERS INSIDE, OUTSIDE, AND DEPTH DIMENSIONS TO 12 INCHES.
Technical manual instrument calibration procedure.
Bureau of Naval Weapons Representative, Pomona, Calif. Metrology Engineering Center.
15 Dec 67, 14p NAVAIR-17-20MD-07

Descriptors: (*Test sets, Calibration), Instruction manuals, Measurement, Test methods, Scale, Test equipment.

The procedure describes the calibration of vernier calipers capable of measuring inside, outside, and depth dimensions from 0 to 12 inches. (Author)
PB-177 878 HC$3.00 MF$0.65

A STUDY OF THE ADAPTABILITY OF THE AUTOMOBILE TO AUTOMATIC CONTROL,
Ohio State Univ., Columbus. Engineering Experiment Station.
For primary bibliographic entry see Field 13F.
PB-178 056 HC$3.00 MF$0.65

9D. Information Theory

REPRESENTATION AND ANALYSIS OF SIGNALS. PART XIII. DISCRETE ORTHONORMAL EXPONENTIALS,
Johns Hopkins Univ., Baltimore, Md.
T. Y. Young, and W. H. Huggins. 6 Nov 62, 9p
Contract AF 30 (602)-2597
Prepared for presentation at the Session 28 of the 1962 National Electronics Conference.

Descriptors: (*Information theory, Mathematical analysis), (*Signals, Detection), Filters (Electromagnetic wave), Transformations (Mathematics), Integral transforms, Functions, Operators (Mathematics).

Digitizing orthonormal exponentials with complex exponents are discussed. The Z-trans forms of continuous orthonormal exponentials are not themselves orthogonal in Z-domain. This is due to the fundamental property sampling that a signal with a frequency spectrum higher than the sampling frequency is not exactly reproducible from its sampled data. For this reason, we introduce the kautz process in the Z-domain to define a set of discrete orthonormal exponentials. These discrete orthonormal exponentials approach the ordinary continuous orthonormal exponentials in the limit as the sampling interval T approaches zero. (Author)
AD-411 370 HC$3.00

EFFECT OF SUBSYSTEMS INFORMATION FEEDBACK ON THE ENTROPY OF THE WHOLE SYSTEM. PART I. FULLY INDEPENDENT SYSTEM.
Quarterly scientific rept. no. 1, 1 Sep-30 Nov 67,
Michigan State Univ East Lansing Div of Engineering Research
M. Z. V. Krzywoblocki, and F. E. Lecureux. Apr 68, 58p
ECOM-0586-1
Contract DAAB07-67-C-0586

Descriptors: (*Information theory, Entropy), Feedback, Probability, Communication systems, Systems engineering, Diagrams, Sensitivity, Data transmission systems.
Identifiers: *Subsystems information feedback.

Group 9D—Information theory

The area of research treated in Quarterly Scientific Report No. 1 is that of fully independent subsystems. The whole system is subject to transformation. A subsystem is transmitted from the sending source system to the transmission system and next to the receiving system. Formulas are given in the report for the entropy of three systems, sensitivity coefficient, etc., and refer to a one-partition system, two partition system and multi-partition systems. The concept of normalization is used and the formalism of it will be presented in a future scientific report. (Author)
AD-667 913 HC$3.00 MF$0.65

ANALYSIS OF PHASE-DETECTION ERROR IN MULTIPLE-SENSOR CORRELATION RECEIVERS WITH HIGH SIGNAL-TO-NOISE RATIOS.
Technical rept.,
Michigan Univ Ann Arbor Inst of Science and Technology
Ferrell G. Stremler. Mar 68, 28p Rept no. 6400-153-T
ECOM-00013-153
Contract DA-28-043-AMC-00013 (E)
Continuation of Contracts DA-36-039-sc-78801 and DA-36-039-sc-52654. Report on proj. MICHIGAN.

Descriptors: (*Phase detectors, Errors), Phase shift, Signal-to-noise ratio, Stochastic processes, Signals, Processing, Numerical analysis, Combat surveillance, Target acquisition.
Identifiers: Michigan project, Signal processing systems.

The ideal phase-detector characteristic is analyzed mathematically for an estimation of the phase difference between two stochastic input signals. High signal-to-noise conditions are assumed in order to linearize the system with respect to the noise. The effects of nonlinearity on the signal are analyzed using a series expansion and low-pass filtering on the receiver output. The mean-square error of the detector is calculated for some typical parameters. (Author)
AD-667 974 HC$3.00 MF$0.65

ENCODING INDEPENDENT SAMPLE INFORMATION SOURCES.
Technical rept.,
Massachusetts Inst of Tech Cambridge Research Lab of Electronics
John T. Pinkston, III. 31 Oct 67, 91p Rept no. TR-462
Contract DA-28-043-AMC-02536 (E), Grant NsG-334
Doctoral thesis.

Descriptors: (*Coding, Theorems), (*Information theory, Coding), Communication systems, Distortion, Noise, Errors, Probability, Entropy, Digital systems, Matrix algebra, Transfer functions, Efficiency, Theses.

The theory of encoding memoryless information sources so that the output can be transmitted with minimum rate and still satisfy a fidelity criterion based on a single letter distortion measure is investigated. This report extends and amplifies the theory developed by Shannon. A general proof of the Source Coding theorem for memoryless sources and single letter distortion measures is presented using variable length codes. It is shown that this proof is more generally applicable than Shannon's previously derived block coding results; moreover, without some additional restrictions, the coding theorem is false if only block codes are permitted. It is also shown that the convergence of encoder rate to R (D) (the minimum rate necessary to achieve average distortion D) with increasing block length n, can be made at least as fast as (log n)/n. (Author)
AD-667 982 HC$3.00 MF$0.65

LANGUAGES, AUTOMATA AND CLASSES OF CHAIN-ENCODED PATTERNS.
New York Univ N Y Lab for Electroscience Research
For primary bibliographic entry see Field 5G.
AD-668 081 HC$3.00 MF$0.65

OPTIMUM FILTERING AND CONTROL OF RANDOMLY SAMPLED SYSTEMS.
Revised ed.,
State Univ of New York Stony Brook
Sheldon S. L. Chang. 13 Jun 67, 10p
AFOSR-68-0755
Grant AF-AFOSR-542-67
Revision of report dated 2 Dec 66.
Availability: Published in IEEE Transactions on Automatic Control, vAC12 n5 p537-46 Oct 1967.

Descriptors: (*Information theory, Sampling), Optimization, Uncertainty, Systems engineering, Feedback, Least squares method, Stability, Interpolation.
Identifiers: Optimal control theory, Kalman filters, Optimal filtering.

Kalman's concept of optimum filtering is interpreted in such a way that it can be applied to both nonlinear and linear systems with Gaussian or non-Gaussian statistics. The essential idea is to synthesize a generalized Kalman filter in two stages, (a) propagation and (b) measurement and correction. The analysis of each stage is independent of the other, and the generalized results are quite simple. In the present paper, the application of the above result is confined to linear systems: (1) Optimum filtering and interpolation of randomly sampled signals; for the interpolation problem it is assumed that the signals are measured exactly at the sampling instant. (2) Optimum filtering of related continuous and randomly sampled signals. (3) Optimum control of randomly sampled linear systems with quadratic cost criterion. (Author)
AD-668 224 Not available from CFSTI.

THE APPLICATION OF BOSE-CHAUDHURI CODES TO THE CONSTRUCTION OF BURST-ERROR-CORRECTING CODES,
Rand Corp Santa Monica Calif
Alan J. Gross. Apr 68, 47p Rept no. RM-5562-PR
Contract F44620-67-C-0045

Descriptors: (*Coding, Communication systems), Matrix algebra, Errors, Decoding, Noise, Efficiency, Optimization.
Identifiers: Bose-Chaudhuri codes, Galois fields.

A study showing that if Bose-Chaudhuri type parity check matrices are augmented by one or two columns, the corresponding codes--constructed by means of Galois fields--not only can correct a predetermined number of independent errors but also can correct bursts of errors that may occur in message transmission. In using such codes, it is necessary to add redundancy to the code messages, that is, to add 'check places' to the original message that do not give any additional information. Thus redundancy is the price for sending a correct message, and the question then becomes one of how to obtain codes having a minimum amount of redundancy for a given message length, and still ensure that although a transmitted message may contain one or more bursts of errors, it will still be decoded correctly. These codes are extensions of the Bose-Chaudhuri codes, dealing with independent error correction. (Author)
AD-668 419 HC$3.00 MF$0.65

A MODIFIED KALMAN FILTER FOR RADIO GUIDANCE APPLICATION,
Aerospace Corp El Segundo Calif
For primary bibliographic entry see Field 17G.
AD-668 447 HC$3.00 MF$0.65

A STUDY OF NORDSTROM-ROBINSON OPTIMUM CODE,
Illinois Univ Urbana Coordinated Science Lab
Franco P. Preparata. Apr 68, 21p Rept no. R-375
Contract DAAB07-67-C-0199, Grant NSF-GK-2339

Descriptors: (*Coding, Nonlinear systems), Polynomials, Permutations, Algebra, Groups (Mathematics), Decoding, Algorithms, Theorems.
Identifiers: *Error correcting codes, Polynomial codes.

The optimum quadratic (15,8) code with minimum distance d=5, recently discovered and studied by Nordstrom and Robinson, can be rather naturally described in terms of polynomials over GF (2). It is shown that the Nordstrom-Robinson code consists of a linear code and of a certain subset of its cosets, which account for its non-linear nature. This representation leads to a non-heuristic proof that weight and distance structures can be treated analogously and that the minimum distance and weight are 5. The analysis of this mechanism may be an essential step in the discovery of an entire class of non-linear double error correcting codes. The given analysis also suggests a systematic decoding procedure. This is based on permutations which map any correctable error pattern (double or single errors) into digit positions for which the computation of a syndrome allows the correction. The correct code word can then be recovered through the inverse permutation. (Author)
AD-668 485 HC$3.00 MF$0.65

ENCODING INDEPENDENT SAMPLE INFORMATION SOURCES.
Massachusetts Inst. of Tech., Cambridge. Research Lab. of Electronics.
J. T. Pinkston, III. 31 Oct 67, 89p NASA-CR-93764, TR-462
Grant NSG-334, Contract DA-28-043-AMC-02536/E/

Descriptors: *Coding, *Information theory, *Theorem proving, Accuracy, Data transmission, Error detection codes, Mathematical models, Operations research, Probability theory, Systems engineering.

For abstract, see STAR 06 10.
N68-20115 HC$3.00 MF$0.65

9E. Subsystems

RESEARCH AND DEVELOPMENT TO DESIGN, FABRICATE AND EVALUATE S.P.D.T. DRY-REED CAPSULES AND RELAY USING THESE CAPSULES.
Quarterly progress rept. no. 2, 1 Jul-30 Sep 64,
General Reed Co., Metuchen, N. J.
A. Zeita. 30 Oct 64, 33p
Contract DA-28-043-AMC-00059 (E)

Descriptors: (*Electronic relays, Packaging), Performance (Engineering), Design, Tests, Reliability, Sliding contacts, Life expectancy, Voltage, Data, Tables, Army research.

The purpose is to obtain performance information on SPDT dry-reed (Genreed C) capsules and to provide designs and performance information on relays using these capsules. Operating characteristics on an initial run of capsules reported. Additional data shown on load determining life tests at four load levels; 1/4, 3/8, 1/2 and 3/4 amp., at cycling rates of 32 cpm and 30 cps. Testing at 30 cps has been completed. Most of the switch capsules were still functioning reliably when testing was discontinued after more than 9.5-million operations. Testing at the 32 cpm rate is approaching 4-million operations and tests are continuing. (Author)
AD-453 192 HC$3.00

PYROLYTIC DECOMPOSITION STUDIES OF TETRAETHOXYSILANE FOR OBTAINING HIGH-GRADE SiO2 FILMS.

Army Electronics Command Fort Monmouth N J
For primary bibliographic entry see Field 7A.
AD-667 897 HC$3.00 MF$0.65

INVESTIGATION OF ELECTRONIC INTERACTION WITH OPTICAL RESONATORS FOR MICROWAVE GENERATION AND AMPLIFICATION.
Varian Associates Palo Alto Calif
For primary bibliographic entry see Field 9A.
AD-667 898 HC$3.00 MF$0.65

RADIO 70 YEARS: COLLECTION ARTICLES.
Foreign Technology Div Wright-Patterson AFB Ohio
For primary bibliographic entry see Field 17B.
AD-667 925 HC$3.00 MF$0.65

AN L-BAND STEP-RECOVERY-DIODE MULTIPLIER,
Harry Diamond Labs Washington D C
Howard I. Bassen. Mar 68, 18p Rept no. HDL-TM-68-9

Descriptors: (*Frequency multipliers, L band), Ultrahigh frequency, Telemetering transmitters, Harmonic generators, Diodes (Semiconductor), Military requirements.
Identifiers: Step recovery diodes.

A times-six multiplier development study was made in an effort to facilitate efficient frequency conversion from the 215- to 260-MHz telemetry band to the new 1435- to 1535-MHz telemetry band. Such a multiplier would enable use of gun-rugged crystal-controlled oscillators to provide stable transmitter capabilities at L-band. A stripline, times-six multiplier was developed using a special gun-rugged step recovery diode in the shunt mode. An efficiency of 39 percent was achieved at 1440 MHz with output powers as high as 3 W attainable at this efficiency level. The physical construction is readily adaptable to the high-shock environments of artillery telemetry. (Author)
AD-667 951 HC$3.00 MF$0.65

EFFECTS OF ULTRASONIC VIBRATIONS ON TRANSISTORS IN SUBASSEMBLIES.
Technical rept.,
Army Electronics Command Fort Monmouth N J
Robert R. Geisler. Oct 67, 24p Rept no. ECOM-2894

Descriptors: (*Printed circuits, Cleaning), (*Cleaning, Ultrasonic radiation), Transistors, Epoxy plastics, Vibration, Performance (Engineering), Dielectric properties, Resistance (Electrical), Failure (Electronics), Coatings, Experimental data.

The effects of an ultrasonic cleaning technique for removal of epoxy-type conformal coatings on printed wiring assemblies were investigated. The sample assemblies included (1) a standard comb-type printed wiring test pattern for evaluation of dielectric withstanding voltage, insulation resistance and Q, and (2) representative military type transistors mounted on printed wiring boards for evaluation of hFE and ICBO. (Author)
AD-667 973 Not available from CFSTI.

DISPERSIVE FILTER IN A CONTROL LOOP,
National Research Council of Canada Ottawa (Ontario) Radio and Electrical Engineering Div
For primary bibliographic entry see Field 13A.
AD-668 043 Not available from CFSTI.

A ROLE FOR INTEGRATED CIRCUITS IN SOUNDING ROCKET PAYLOAD CONTROL APPLICATIONS,
National Research Council of Canada Ottawa (Ontario) Radio and Electrical Engineering Div
For primary bibliographic entry see Field 22B.
AD-668 045 Not available from CFSTI.

CONVERSION OF MICROSECOND INTERVALS OF TIME TO DIGITAL CODE,
Foreign Technology Div Wright-Patterson AFB Ohio
For primary bibliographic entry see Field 18D.
AD-668 047 HC$3.00 MF$0.65

ARRAY ANTENNAS.
Technical memo.,
Johns Hopkins Univ Silver Spring Md Applied Physics Lab
T. C. Cheston, and J. Frank. Mar 68, 143p Rept no. APL-TG-956
Contract NOw-62-0604, ARPA Order-805

Descriptors: (*Phased arrays, *Radar antennas), Scanning, Theory, Antenna apertures, Impedance matching, Errors, Bandwidth, Antenna feeds, Multiple beam antennas, Coupling circuits, Integrated systems, Antenna arrays.

Array antennas in their various forms are discussed and analyzed with special reference to electronic scanning. The effects of mutual coupling of the radiating elements are considered and methods of matching are given. Quantization errors, particularly those found in phased arrays, are calculated and bandwidth limitations are derived. Specific array antenna systems are described. (Author)
AD-668 137 HC$3.00 MF$0.65

TOWARDS A THEORY OF THE SYNTHESIS OF ANTENNAS WITH VOLUMETRIC DISTRIBUTION OF SOURCES,
Foreign Technology Div Wright-Patterson AFB Ohio
V. N. Dymskii. 4 Aug 67, 34p Rept no. FTD-MT-24-113-67
Edited machine trans. of Aviatsionnyi Institut, Kazan. Trudy (USSR) n82 p3-26 1964.

Descriptors: (*Antennas, Theory), Synthesis, Electric currents, Density, Power, Optimization, Spheres, Functions, Operators (Mathematics), Tensor analysis, Hilbert space, USSR.
Identifiers: Translations, Radiation patterns.

A problem is considered of calculating the directional pattern on the basis of a continuous distribution of spatial density of external currents specified in a bounded region. The problem is reduced to constructing the vector eigen-functions of an integral operator defined on a sphere. It is proven that the operator is self-adjoint, bounded, and continuous for any finite volume of current distribution. The conditions are determined of an optimal solution which corresponds to the maximum ratio of radiated power to the external current norm. A rigorous solution of the problem, for the radiating regions that have a spherical-layer and spheroid-layer shapes, is presented as an illustration.
AD-668 158 HC$3.00 MF$0.65

MAINTAINABILITY DEMONSTRATION RESULTS FOR 12 ELECTRONIC SUBSYSTEMS,
Philco-Ford Corp Palo Alto Calif Western Development Lab
Lynn V. Rigby. Dec 65, 153p
SAMSO-TR-68-159
Contract AF 04 (695)-547

Descriptors: (*Electronic equipment, Maintenance), Maintainability, Maintenance personnel, Malfunctions, Simulation, Time, Failure (Electronics), Sampling, Printed circuits, Telemeter systems, Diagrams, Photographs.

This report presents the procedures employed, the results obtained, and ancillary findings and insights gained from 12 separate maintainability demonstrations. These demonstrations were conducted in accordance with MIL-M-26512, on electronic equipment installed at five operating ground sites. A total of 419 simulated malfunctions were inserted into 11 of these subsystems under carefully controlled conditions, and the times required to diagnose and correct these malfunctions were recorded. The twelfth demonstration was based on analysis of field-generated trouble and failure reports. The results are sure to be of interest to both the theoretician and the practitioner in the field of maintainability engineering, and will hopefully serve and interest many in the broader areas of system planning, system simulation, and system evaluation. (Author)
AD-668 182 HC$3.00 MF$0.65

CITY NOISE AND ITS EFFECT UPON AIRBORNE ANTENNA NOISE TEMPERATURES AT UHF.
Massachusetts Inst of Tech Lexington Lincoln Lab
For primary bibliographic entry see Field 20A.
AD-668 192 Not available from CFSTI.

A PERMUTATION NETWORK,
Stanford Research Inst Menlo Park Calif
For primary bibliographic entry see Field 9B.
AD-668 205 Not available from CFSTI.

DIRECTIVITY OF AN ARRAY OF SLOTS ON THE SURFACE OF A CYLINDER.
Journal article,
Massachusetts Inst of Tech Lexington Lincoln Lab
Leon J. Ricardi. 8 Dec 66, 4p Rept no. JA-2823B
ESD-TR-68-32
Contract AF 19 (628)-5167
Availability: Published in Electronic Engineering, Sep 67.

Descriptors: (*Slot antennas, *Antenna radiation patterns), Antenna arrays, Cylindrical bodies, Configuration, Equations, Field theory.

General expressions for the directivity of arrays of axial and circumferential slots on an infinite conducting cylinder are derived. The optimum spacing for 2- to 7-slot arrays on an infinite cylinder between 1 and 4 wavelengths in diameter is presented, and the minimum number of slots required to produce a uniform pattern in the equatorial plane is determined. (Author)
AD-668 239 Not available from CFSTI.

HIGH-INFORMATION-DENSITY STORAGE SURFACES.
Stanford Research Inst Menlo Park Calif
For primary bibliographic entry see Field 9B.
AD-668 242 HC$3.00 MF$0.65

MEASUREMENT OF THE POTENTIAL EFFECTIVENESS OF TAHA IN A DIVERSITY SYSTEM.
Final rept.,
Raytheon Co Norwood Mass Communications and Data Processing Operation
Joseph T. deBettencourt, James F. Roche, Carson K. H. Tsao, and John S. Underwood. Apr 68, 32p Rept no. CDP-TR-9
ECOM-00398-F
Contract DAAB07-67-C-0398

Descriptors: (*Horn antennas, Effectiveness), Ionospheric propagation, Attenuation, Polarization, Antenna apertures, High frequency, Signal-to-noise ratio, Performance (Engineering).
Identifiers: *Tapered aperture horn antennas, TAHA (Tapered Aperture Horn Antenna).

A measurement program was conducted to assess the potential effectiveness of the Tapered Aperture Horn Antenna (TAHA), at LaPlata, Maryland in a polarization diversity reception system. Measurements were made at LaPlata on HF test signals transmitted from Hawaii and Davis (San Francisco) stations. The results indicated that the

two polarized components received on the two ports of TAHA have very low correlation coefficients under all ionospheric conditions encountered during a four day test period. The distributions of signal-to-noise were computed to determine the degree of improvement afforded by using TAHA in a polarization diversity system. (Author)
AD-668 249 HC$3.00 MF$0.65

RADIATION EFFECTS ON THIN FILM INTEGRATED CIRCUIT ELEMENTS.
Final rept. no. 9, 15 Oct 66-14 Oct 67,
North American Rockwell Corp Anaheim Calif Autonetics Div
Ross A. Williams, Albert F. Krueger, Albert J. Chesavage, Donald K. Nichols, and Virgil H. Strahan. Apr 68, 45p Rept no. C7-420.3/501
ECOM-02431-F
Contract DA-28-043-AMC-02431 (E)
Continuation of contract no. DA-28-043-AMC-01467 (E).

Descriptors: (*Integrated circuits, *Radiation damage), Films, Deposits, Microminiaturization (Electronics), Substrates, X rays, Aluminum, Scattering, Absorption, Glass, Mica, Alumina, Electrons, Mathematical analysis, Nuclear radiation, Thickness, Emissivity, Intensity, Theory.

The charge change seen by a thin-film conductor deposited on a substrate due to electrons scattered from the substrate by incident X rays was investigated both experimentally and theoretically. Targets consisting of thin-film aluminum conductor patterns were deposited on alumina, glass, and mica substrates and irradiated with photons from 600 keV and 2 MeV pulsed flash X-ray units and with both bremsstrahlung and 18 MeV electrons from a linear accelerator. It was found that electrons scattered from the substrate were emitted in two energy groups, one with energies less than 100 eV and one with energies of the same order of magnitude as the incident photon energy. The charge change seen by the conductor was found to be the result of scattering of electrons from the target by the incident photons and absorption by the target of electrons scattered from materials between the target and the photon source. The absorption or emission of the low energy electrons can be controlled by altering the potential on the target. The dependence of the charge scattering effect on photon energy conductor area, and target thickness was measured. The charge seen by the conductor was found to be proportional to the conductor area in the absence of fringe fields and to be an increasing function of substrate thickness. Theoretical calculations were made for the high-energy component of charge scattering for both thick and thin targets. This was found to be of the same order of magnitude as the high-energy component for the 600 keV X rays and to decrease relative to the high-energy component with increasing energy. The theoretical calculations of the high-energy component covered the photon energy range from 0.05 to 20 MeV. (Author)
AD-668 257 HC$3.00 MF$0.65

INVESTIGATION OF NETWORK REALIZABILITY II.
Final rept. 1 Nov 67-31 Jan 68,
New York Univ N Y Lab for Electroscience Research
Mohammed S. Ghausi. 29 Feb 68, 28p Rept no. TR-400-180
AFCRL-68-0117
Contract AF 19 (628)-5537
See also Scientific report no. 1, AD-634 064.

Descriptors: (*Electrical networks, *Integrated circuits), Microminiaturization (Electronics), Sensitivity, Data transmission systems, Electric filters, Transfer functions, Reports.
Identifiers: Distributed RC networks, Circuit theory.

The final report describes the results of our research under contract AF 19 (628)-5537 from November 1, 1965 to January 31, 1968. The study covered the following general areas of investigations which are compatible with integrated circuits. (a) The analysis and design of RC distributed networks. (b) Design methods for active RC networks and related problems. The report briefly summarizes these investigations and lists all publications which have resulted under this contract.
AD-668 434 HC$3.00 MF$0.65

DESIGN STUDIES FOR 440-FOOT-DIAMETER RADIO AND RADAR TELESCOPE.
Technical rept.,
Massachusetts Inst of Tech Lexington Lincoln Lab
Herbert G. Weiss. 20 Feb 68, 29p Rept no. TR-445
ESD-TR-68-19
Contract AF 19 (628)-5167

Descriptors: (*Radio telescopes, Parabolic antennas), (*Parabolic antennas, Feasibility studies), Radio astronomy, Radomes, Design, Performance (Engineering), Costs, Gain, Tolerances (Mechanics), Structures, Wind, Reflectors.
Identifiers: Haystack hill antennas, Sizes (Dimensions).

Studies conducted by the Cambridge Radio Observatory Committee during the past two years show that a large steerable telescope can be constructed at lower cost and with higher precision if the antenna is protected from the environment by a radome. These studies also indicate that the extremely high pointing precision (10 arc-sec) needed to make effective use of a large aperture at wavelengths as short as 5 cm can be obtained with a radome-protected antenna. The proposed 440-foot antenna employs a deflection-compensated vertical truss reflector support structure to maintain a 0.09-inch rms tolerance in the primary reflector under all operating conditions. The low cost of the antenna results from the ability to use lightweight reflector panels, an efficient computer-optimized reflector support structure, a small-diameter azimuth bearing, and a low-power control system. The estimated cost of this novel antenna design and the radome is substantially lower than the cost of alternative exposed antennas. The equivalent aperture and gain of the proposed antenna-radome system are made equal to that of a 400-foot antenna by increasing the antenna diameter by 10 percent. This report also describes the 520-foot-diameter space-frame radome and the planned electronic instrumentation and control facilities for a proposed radio and radar observatory. (Author)
AD-668 474 HC$3.00 MF$0.65

LES-5 TRIPLEXER.
Massachusetts Inst. of Tech., Lexington. Lincoln Lab.
For primary bibliographic entry see Field 17B.
AD-823 174 HC$3.00 MF$0.65

SAWTOOTH VOLTAGE GENERATORS WITH UNIJUNCTION TRANSISTORS.
Generatori Di Tensioni A Denti Di Sega Con Transistori Unigiunzione
Centro Di Studio Per La Fisica Delle Microonde, Florence (Italy).
V. Cappellini, and P. F. Checcacci. Sep 64, 54p CM-R17-4.5
Lang- in Italian

Descriptors: *Sawtooth waveforms, *Silicon transistors, *Voltage generators, Linear circuits, Relaxation oscillators.

For abstract, see STAR 06 10.
N68-20441 HC$3.00 MF$0.65

SPACE ELECTRONICS - LINEAR DETECTOR, SUB-CARRIER FREQUENCY METER.
Elettronica Spazio - Rivelatore Lineare, Frequenzimetro Discriminatore Per Sub-carriea Centro Di Studio Per La Fisica Delle Microonde, Florence (Italy).
P. F. Checcacci, and P. F. Pellegrini. Mar 64, 23p CM-R13-4.4
Lang- in Italian

Descriptors: *Carrier waves, *Frequency measurement, *Signal detection, Demodulation, Linear circuits, Measuring instruments, Radio signals, Signal detectors, Transistors.

For abstract, see STAR 06 10.
N68-20444 HC$3.00 MF$0.65

AN INCREMENTAL PHASE CHANGER FOR OFFSETTING TIME AND FREQUENCY STANDARDS.
Royal Aircraft Establishment, Farnborough (England).
J. P. Bentick. Sep 67, 15p RAE-TR-67230

Descriptors: *Electromechanical devices, *Frequency control, *Frequency standards, *Phase control, *Universal time, Potentiometers (resistors), Rubidium, Time signals, Very low frequencies.

For abstract, see STAR 06 10.
N68-20486 HC$3.00 MF$0.65

SET OF FREQUENCY SYNTHESIZERS AND DIVIDERS.
Ensemble des Pilotes Et Diviseurs
Laboratoire de Recherches Balistiques Et Aerodynamiques, Vernon (France).
G. Feuerstein. 7 Dec 67, 58p NT-70/67/EG
Lang- in French

Descriptors: *Centrifuges, *Frequency dividers, *Frequency synthesizers, Frequency control, Frequency stability, Frequency standards, Piezoelectric crystals, Trigger circuits.

For abstract, see STAR 06 10.
N68-20488 HC$3.00 MF$0.65

TRAPEZOIDAL PULSE SHAPING CIRCUIT,
Brown and Root, Inc., Houston, Tex.
Leslie B. Robinson. 18 Feb 66, 2p
Contract NSF-C-260
Availability: Microfiche only after original copies are exhausted.Prepared in cooperation with Hopkins, Inc., Minneapolis, Minn.

Descriptors: (*Pulse amplifiers, Modulation), Pulse systems, Transistors, Diodes (Semiconductor), Fixed capacitors, Transducers, Low-pass filters, Power amplifiers, Coupling circuits.

This is a system for modulating the output voltage envelope from a power bridge amplifier. This technique is used in the Mohole Long Baseline System Bottom Transponder to shape the pulse applied to a transducer and thereby limit undersirable side band frequency content of the pulse.
PB-176 903 MF$0.65

9F. Telemetry

M532 BATTERY TELEMETER,
Harry Diamond Labs Washington D C
Gordon A. Nicolaisen. Jan 68, 30p Rept no. HDL-TM-68-2

Descriptors: (*Telemeter systems, *Projectiles), Fuzes (Ordnance), Batteries + components, Frequency modulation, Very high frequency, Telemetering transmitters, Calibration, Electrical networks, Acceleration, Spin, Voltage-controlled oscillators, Reliability (Electronics), Firing tests (Ordnance), Transistors, Diagrams.
Identifiers: M-532 telemeters.

A completely self-contained three-channel telemetry system for testing fuze power supplies on artillery or mortar projectiles is described. The telemeter consists of a transmitter, three subcarrier oscillators, in-flight calibrator, battery, and signal-con-

ditioning networks, all especially packaged to withstand linear accelerations up to 25,000 g and spin rates up to 22,000 rpm. Field tests indicate the telemeter performs reliably in this environment. (Author)
AD-667 950 HC$3.00 MF$0.65

AN L-BAND STEP-RECOVERY-DIODE MULTIPLIER,
Harry Diamond Labs Washington D C
For primary bibliographic entry see Field 9E.
AD-667 951 HC$3.00 MF$0.65

MAINTAINABILITY DEMONSTRATION RESULTS FOR 12 ELECTRONIC SUBSYSTEMS,
Philco-Ford Corp Palo Alto Calif Western Development Lab
For primary bibliographic entry see Field 9E.
AD-668 182 HC$3.00 MF$0.65

ADVANCED TECHNOLOGICAL SATELLITE ELECTRO-MECHANICAL DESPUN ANTENNA FINAL REPORT.
Sylvania Electric Products, Inc., Waltham, Mass. Electronic Systems Eastern Div.
L. Blaisdell. 19 Oct 67, 151p NASA-CR-93732, F181-1
Contract NAS5-9521

Descriptors: *Applications technology satellites, *Electromechanical devices, *Microwave antennas, *Spin reduction, Mechanical drives, Spacecraft communication, Spin stabilization, Temperature effects.

For abstract, see STAR 06 10.
N68-19789 HC$3.00 MF$0.65

SPECIAL STUDIES OF AROD SYSTEM CONCEPTS AND DESIGNS.
ADCOM, Inc., Cambridge, Mass.
D. B. Crow. 15 Oct 66, 76p NASA-CR-61668, G-69-TR-2
Contract NAS8-20128

Descriptors: *Airborne range and orbit determination, *Radio direction finders, *Signal processing, *Systems analysis, Doppler effect, Filters, Ground stations, Preamplifiers, Radio receivers, Signal to noise ratios, Systems engineering.

For abstract, see STAR 06 10.
N68-19826 HC$3.00 MF$0.65

ADVANCED TECHNOLOGICAL SATELLITE ELECTRO-MECHANICAL DESPUN ANTENNA. APPENDICES FINAL REPORT.
Sylvania Electric Products, Inc., Waltham, Mass. Electronic Systems Eastern Div.
L. Blaisdell. 19 Oct 67, 278p NASA-CR-93735, F181-1, APP.
Contract NAS5-9521

Descriptors: *Antenna radiation patterns, *Applications technology satellites, *Electromechanical devices, *Radio frequency interference, Antennas, Graphs (charts), Impedance, Spin reduction, Thermal energy, Vibration tests.

For abstract, see STAR 06 10.
N68-19934 HC$3.00 MF$0.65

IONOSPHERIC EFFECTS ON TELEMETRY AND TRACKING SIGNALS FROM ORBITING SPACECRAFT.
National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
R. J. Coates, and T. S. Golden. Mar 68, 11p NASA-TM-X-63152, X-520-68-76

Descriptors: *Ionospheric disturbances, *Signal transmission, *Spacecraft tracking, Auroral zones, Magnetic equator, Minitrack system, Scintillation, Solar activity, Tracking stations, Very high frequencies.

For abstract, see STAR 06 10.
N68-20043 HC$3.00 MF$0.65

SPECIAL STUDIES OF AROD SYSTEM CONCEPTS AND DESIGNS.
ADCOM, Inc., Cambridge, Mass.
D. B. Crow. 14 Jul 67, 66p NASA-CR-61669, G-69-TR-3
Contract NAS8-20128

Descriptors: *Airborne range and orbit determination, *Directional control, *Ground stations, *Radar receivers, *Systems engineering, Ground support equipment, Signal reception.

For abstract, see STAR 06 10.
N68-20107 HC$3.00 MF$0.65

FEASIBILITY STUDY OF LARGE SPACE ERECTABLE ANTENNAS. VOLUME 4 - STUDY, PARABOLIC EXPANDABLE TRUSS ANTENNA EXPERIMENT.
General Dynamics/Convair, San Diego, Calif.
23 Feb 68, 557p NASA-CR-93837, GD/C-DCL-67-002, V. 4
Contract NASW-1438

Descriptors: *Expandable structures, *Parabolic antennas, *Space erectable structures, Antenna radiation patterns, Apollo project, Attitude control, Electric power, Extravehicular activity, Space navigation, Traffic control.

For abstract, see STAR 06 10.
N68-20267 HC$3.00 MF$0.65

FEASIBILITY STUDY OF LARGE SPACE ERECTABLE ANTENNAS. VOLUME 3 - SUMMARY. PARABOLIC EXPANDABLE TRUSS ANTENNA EXPERIMENT.
General Dynamics/Convair, San Diego, Calif.
22 Jan 68, 32p NASA-CR-93833, GD/C-DCL-67-002, V. 3
Contract NASW-1438

Descriptors: *Apollo applications program, *Expandable structures, *Parabolic antennas, *Space erectable structures, Astronaut performance, Experimental design, Feasibility, Trusses.

For abstract, see STAR 06 10.
N68-20304 HC$3.00 MF$0.65

THE INPUT ADMITTANCE OF A RECTANGULAR APERTURE ANTENNA LOADED WITH A DIELECTRIC PLUG.
National Aeronautics and Space Administration. Langley Research Center, Langley Station, Va.
D. M. Hatcher, and C. T. Swift. Apr 68, 27p
NASA-TN-D-4430
Contract 129-01-03-03-23

Descriptors: *Antenna feeds, *Apertures, *Waveguides, Antenna radiation patterns, Dielectrics, Integral equations, Mathematical models, Quartz, Wave propagation.

For abstract, see STAR 06 10.
N68-20333 HC$3.00 MF$0.65

SPACE ELECTRONICS - TWO TELEMETRY CALIBRATION SETS, PULSE MODULATION GENERATOR FOR TRANSMITTERS.
Elettronica Spazio - Due Tipi Di Calibratori Telemetrici, Modulatore Impulsivo Per Trasmettitore
Centro Di Studio Per La Fisica Delle Microonde, Florence (Italy).
P. F. Checcacci, and P. F. Pellegrini. Mar 64, 19p CM-R14-2.3
Lang- in Italian

Descriptors: *Calibrating, *Pulse generators, *Telemetry, Measuring instruments, Modulators, Signal generators, Test equipment.

For abstract, see STAR 06 10.
N68-20407 HC$3.00 MF$0.65

AUTOMATIC READER OF RECORDED DATA.
Lettore Automatico Di Registrazioni Grafiche
Centro Di Studio Per La Fisica Delle Microonde, Florence (Italy).
V. Cappellini, and P. F. Checcacci. Jul 65, 14p CM-R23-2.5
Lang- in Italian

Descriptors: *Data processing, *Data transmission, *Digital techniques, Data converters, Optical scanners, Photoelectricity, Satellite transmission, Signal analyzers, Signal reception.

For abstract, see STAR 06 10.
N68-20443 HC$3.00 MF$0.65

INPUT IMPEDANCE OF SHORT DIPOLAR ANTENNAS ON A NIKE- APACHE ROCKET VEHICLE.
Impedenza Di Ingresso Di Antenne Dipolari Corte Su Un Razzo Nike-apache
Centro Di Studio Per La Fisica Delle Microonde, Florence (Italy).
G. Ventura. Nov 66, 30p CM-R39-10.4
Lang- in Italian

Descriptors: *Dipole antennas, *Electrical impedance, *Nike-apache rocket vehicle, *Scale models, Impedance measurements, Italy, Numerical analysis.

For abstract, see STAR 06 10.
N68-20518 HC$3.00 MF$0.65

SURVEY ON TELEMETRIC EQUIPMENT AND SYSTEMS IN GERMANY.
Soskuty (O. V.), Frankfurt am Main (West Germany).
O. V. Soskuty. 5 Sep 66, 51p
Prepared in cooperation with Business and Defense Services Administration, Washington, D. C.

Descriptors: (*Telemeter systems, West Germany), (*Commerce, West Germany), Telemetering receivers, Magnetic recording systems, Sensors, Real time, Amplitude modulation, Frequency modulation, Accuracy, Transistor amplifiers, Industries, Statistical data, Maintenance, Costs, Medicine.

Contents: State of the art; Economic indicators; The market; Marketing factors; and Marketability of American equipment.
PB-177 884 HC$3.00 MF$0.65

10. ENERGY CONVERSION (NON-PROPULSIVE)

10A. Conversion Techniques

DIRECT CONVERSION OF VARIOUS FORMS OF ENERGY INTO ELECTRIC AND MECHANICAL POWER.
Foreign Technology Div Wright-Patterson AFB Ohio
G. N. Alekseev. 20 Jul 67, 270p Rept no. FTD-MT-64-355
Edited machine trans. of mono. Neposredstvennoe Prevrashchenie Razlichnykh vidov Energii v Elektricheskuyu Mekhanicheskuyu, Moscow/Leningrad, 1963 336p.

Descriptors: (*Energy conversion, Reviews), Power supplies, Batteries + components, Fuel cells, Thermoelectricity, Generators, Thermionic converters, Plasma generators, Magnetohydrodynamic generators, Electric propulsion, Radioactive isotopes, Power reactors, Nuclear propulsion, Thermonuclear reactions, Solar cells, Solar sails, USSR.
Identifiers: Radioisotope generators, Photon rockets, Translations.

Group 10A—Conversion techniques

Contents: Direct conversion of chemical energy to electrical energy (Theory of fuel cells, Fuel cells with solid fuel, Fuel cells with gaseous fuel, Combined (solid-gas) fuel cells, Fuel cells with liquid fuel, Oxidizing reducing cells, Possibilities of application of fuel cells); Direct transformation of thermal energy into electrical and mechanical energy (Thermoelectric generators, Vacuum thermionic emission electric generators, Gas-filled thermionic emission electric generators, Plasma thermionic emission electric generators, Certain general questions for thermionic electric generators, Information on magnetohydrodynamics, Magnetohydrodynamic electric generators, Electrorocket motors); Direct transformation of nuclear energy into electrical and mechanical energy (Radioisotope electric generators, Nuclear radioisotope motors, Nuclear reactor electric generators, Nuclear reactor motors, Thermonuclear electric generators, Thermonuclear motors); Direct transformation of solar energy into electrical and mechanical energy (Solar electric generators, Solar sail, Photon rocket motor).

AD-668 263 HC$3.00 MF$0.65

CALCULATION OF THE WORKING PROCESS IN A COOLED GAS TURBINE,
Foreign Technology Div Wright-Patterson AFB Ohio
For primary bibliographic entry see Field 21E.
AD-668 294 HC$3.00 MF$0.65

VORTEX EFFECTS IN A TURBINE STAGE,
Foreign Technology Div Wright-Patterson AFB Ohio
For primary bibliographic entry see Field 21E.
AD-668 511 HC$3.00 MF$0.65

GAS BEARING APPLICATIONS IN SPACE POWER TURBOMACHINERY.
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
W. J. Anderson. 1966, 57p NASA-TM-X-57367

Descriptors: *Gas bearings, *Journal bearings, *Spacecraft power supplies, *Thrust bearings, *Turbogenerators, Axial flow turbines, Centrifugal compressors, Radial flow, Shafts (machine elements), Turbocompressors.

For abstract, see STAR 06 10.
N68-19606 HC$3.00 MF$0.65

EFFECTS OF 22 ME V PROTON AND 2.4 ME V ELECTRON RADIATION ON BORON AND ALUMINUM-DOPED SILICON SOLAR CELLS.
National Aeronautics and Space Administration. Langley Research Center, Langley Station, Va.
W. E. Ellis, and G. A. Haynes. Apr 68, 67p NASA-TN-D-4407
Contract 120-33-01-01-23

Descriptors: *Aluminum, *Boron, *Electron irradiation, *Proton irradiation, *Solar cells, Dopes, Electrical properties, P-n junctions.

For abstract, see STAR 06 10.
N68-19924 HC$3.00 MF$0.65

ANALYSIS OF GEOMETRY AND DESIGN POINT PERFORMANCE OF AXIAL FLOW TURBINES. PART 3 - DESIGN ANALYSIS OF SELECTED EXAMPLES FINAL REPORT.
Northern Research and Engineering Corp., Cambridge, Mass.
A. F. Carter, and F. K. Lenherr. 29 Feb 68, 77p NASA-CR-72385, NREC-1125-3, PT. 3
Contract NAS3-9418

Descriptors: *Axial flow turbines, *Computerized design, *Stream functions (fluids), Axial flow, Compressor efficiency, Computer programs, Flow geometry, Stator blades, Work capacity.

For abstract, see STAR 06 10.
N68-19929 HC$3.00 MF$0.65

INVESTIGATION OF THE USE OF THE LUNAR SURFACE LAYER TO STORE ENERGY FOR GENERATING POWER DURING THE LUNAR NIGHT.
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
G. J. Barna, and R. L. Johnson. Apr 68, 19p NASA-TM-X-1560
Contract 120-33-05-02-22

Descriptors: *Electric energy storage, *Heat storage, *Lunar soil, *Rankine cycle, *Solar generators, Heat exchangers, Power efficiency, Solar energy, Thermal absorption, Thermal energy.

For abstract, see STAR 06 10.
N68-20363 HC$3.00 MF$0.65

CD S SOLAR CELL DEVELOPMENT INTERIM TECHNICAL REPORT.
Clevite Corp., Cleveland, Ohio. Electronic Research Div.
W. K. Bower, J. R. Green, and F. A. Shirland. 29 Feb 68, 87p NASA-CR-72382
Contract NAS3-9434

Descriptors: *Cadmium sulfides, *Solar cells, *Thin films, Degradation, Electrochemistry, Fabrication, High temperature environments, Substrates, Thermal cycling tests, Vacuum apparatus.

For abstract, see STAR 06 10.
N68-20410 HC$3.00 MF$0.65

A 23.4 SQUARE-FOOT (2.17-SQ-M) CADMIUM SULFIDE THIN-FILM SOLAR CELL ARRAY.
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
H. W. Brandhorst, Jr., and A. E. Spakowski. Apr 68, 11p NASA-TM-X-1519
11 P Refs

Descriptors: *Cadmium sulfides, *Solar cells, *Thin films, Arrays, Efficiency, Electrical resistance, Indium, Output, Servocontrol, Tensile strength.

For abstract, see STAR 06 10.
N68-20432 HC$3.00 MF$0.65

DESIGN OF RUNNER BLADES OF FRANCIS TURBINE BY BAUERSFELD METHOD.
Technical translations,
National Science Foundation, Washington, D. C. Special Foreign Currency Science Information Program.
V. V. Barlit. 1967, 16p SFCSI-Int (TT-67-59002)
Trans. of Izvestiya Vysshikh Uchebnykh Zavedenii. Energetika (USSR) n11 p113-20 1962.

Descriptors: (*Turbine blades, Design), Turbines, Hydraulic systems, Gas flow, Trailing edge, Turbine parts, Axially symmetric flow, Mathematical analysis.
Identifiers: Runner blades, Francis turbines, Bauersfeld method.

The designed and partly tested models of the runner are divided into three groups: (a) those designed according to Bauersfeld method (ROP2 and ROP3); (b) those designed according to the conformal mapping method RO320 and ROP1; (c) blade profiling with vortex meridional flow taking into account the functioning of the distributor (ROP4, ROP6 and ROP7). On the basis of the test results of the runner models, it is possible to arrive at definite conclusions regarding each one of the design methods indicated above. (Author)
TT-67-59002 HC$3.00 MF$0.65

10B. Power Sources

SOLAR CELL POWER SYSTEMS FOR APL SATELLITES.
Technical memo.,
Johns Hopkins Univ Silver Spring Md Applied Physics Lab
Robert E. Fischell. Feb 68, 33p Rept no. APL-TG-950
Contract NOw-62-0604

Descriptors: (*Satellites (Artificial), *Solar cells), (*Electric power production, Satellites (Artificial)), Power supplies, Performance (Engineering), Reliability (Electronics), Batteries + components, Temperature, Voltage, Nuclear power plants, Thermoelectricity, Auxiliary power plants, Plutonium, Diodes (Semiconductor), Attitude control systems, DC to DC converters, Diagrams, Soldering.
Identifiers: Gravity-gradient stabilization, SNAP 3, *Space electric power systems.

Since 1959, the Applied Physics Laboratory has designed and launched 31 earth satellites. From very simple, low-power design in 1959, there have developed much more sophisticated solar cell power systems that generate higher power levels. This paper describes the development of various power systems and the application of several control techniques for improving satellite operating performance and reliability. (Author)
AD-668 144 HC$3.00 MF$0.65

SPECIALIZED CALCULATING MACHINES FOR CALCULATION OF ECONOMIC DISTRIBUTION OF ACTIVE LOADS IN POWER SYSTEMS,
Foreign Technology Div Wright-Patterson AFB Ohio
S. A. Ginzburgh, A. N. Stavrovskii, and V. D. Shlimovich. 27 Oct 67, 18p Rept no. FTD-MT-24-316-67
Edited machine trans. of Elektrichestvo (USSR) n7 p85-9 1966.

Descriptors: (*Power plants (Establishments), Distribution), (*Analog computers, Electric power production), State-of-the-art reviews, Electrical networks, Costs, Efficiency, Control systems, Bibliographies, USSR, United States, Japan.
Identifiers: Translations.

Based on 1957--65 Soviet, 1955--62 Western, and 1959--64 Japanese literature, a review is presented which covers the following points: Scope of problems and type (mostly analog) of computer. Representation of incremental-rate characteristics of plants. Allowance for network losses. Uses of special-purpose computers and economic efficiency: (a) prediction of load diagrams, (b) counseling the dispatcher, and (c) automatic control. Data on uses of special-purpose computers in the following power systems is presented: Estonian Power System; Sverdlovsk, Chelyabinsk, Bashkir ASSR, Donbass Power Systems; Ural Joint Dispatching System; European-SSSR Joint Dispatching System; Altay Power System; Georgian SSR Power System; West-Siberian Joint Dispatching System; Hungarian Joint Dispatching System; S. California, Edison Co.; West Penna.; Ohio Edison Co.; Colorado Public Service Co.; unnamed Soviet Power System; Kusu, Tubu, Japanese System; Tugoku, Tokyo System.
AD-668 183 HC$3.00 MF$0.65

DIRECT CONVERSION OF VARIOUS FORMS OF ENERGY INTO ELECTRIC AND MECHANICAL POWER,
Foreign Technology Div Wright-Patterson AFB Ohio
For primary bibliographic entry see Field 10A.
AD-668 263 HC$3.00 MF$0.65

AN EXPERIMENTAL STUDY OF THE BEHAVIOR OF LARGE NEGATIVE IONS.
Franklin GNO Corp West Palm Beach Fla
For primary bibliographic entry see Field 20I.
AD-668 339 HC$3.00 MF$0.65

BOUNDARY PHENOMENA IN MHD GENERATORS.
Summary rept.,
Stanford Univ Calif Plasma Gasdynamics Lab
R. H. Eustis, M. Mitchner, and C. H. Kruger. 15 Feb 68, 20p
AFOSR-68-0859
Contract AF 49 (638)-1695

Descriptors: (*Magnetohydrodynamic generators, Magnetohydrodynamics), Turbulence, Electrical conductance, Probes (Electromagnetic), Interactions, Potassium, Argon, Plasma medium, Transport properties, Boundary layer, Spectroscopy, Gas discharges.
Identifiers: Plasma diagnostics, Seedants.

The investigations included in this research are as follows: Experiments on turbulent Hartmann flow in plasmas; Turbulence suppression in magnetohydrodynamic flows; Nonuniform electrical conduction in magnetohydrodynamic channels; Electrostatic probe theory and application in a high-temperature, collision-dominated, potassium-seeded argon plasma; Electron transport coefficients for two-temperature plasmas; Necessary conditions for the validity of the two-temperature plasma model; Experimental electrode current distributions in MHD channels; The influence of boundary layers on spectroscopic temperature measurements in MHD channels; Discharge characteristics in a seeded plasma flow. (Author)
AD-668 454 HC$3.00 MF$0.65

SNAP-23A PROGRAM. PHASE I. THERMOELECTRIC CONVERTER DEVELOPMENT PROGRAM.
Quarterly rept. no. 3, 1 Jul-30 Sep 67,
Minnesota Mining and Mfg. Co., St. Paul.
J. V. Wachenheim. 1967, 91p
Contract AT (30-1)-3824

Descriptors: (*Nuclear power plants, Spaceborne), (*Thermionic converters, Spaceborne), Materials, Design, Performance (Engineering).
Identifiers: SNAP-23A.

For abstract, see NSA 22 08.
MMM-3824-0013 HC$3.00 MF$0.65

SOLAR THERMOELECTRIC GENERATOR DESIGN AND PANEL DEVELOPMENT PROGRAM FABRICATION REPORT.
Radio Corp. of America, Harrison, N. J.
L. H. Gnau. 20 Mar 68, 65p NASA-CR-72386, RCA-647FR-32068
Contract NAS3-10600

Descriptors: *Flat plates, *Germanium, *Silicon, *Solar cells, *Thermoelectric generators, Beryllium, Engineering drawings, Metal bonding, Panels, Thermal insulation.

For abstract, see STAR 06 10.
N68-19707 HC$3.00 MF$0.65

THE FEASIBILITY OF WIRELESS POWER TRANSMISSION FOR AN ORBITING ASTRONOMICAL STATION.
National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
W. J. Robinson, Jr.. 15 Feb 68, 44p NASA-TM-X-53701

Descriptors: *Electric power transmission, *Microwave transmission, *Orbital space stations, *Power efficiency, Electric generators, Lasers, Microwave frequencies, Systems engineering.

For abstract, see STAR 06 10.
N68-20045 HC$3.00 MF$0.65

DISCHARGE CHARACTERISTICS OF SOME COPPER OXIDE-MAGNESIUM THERMAL CELLS.
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
L. H. Thaller. Apr 68, 23p NASA-TN-D-4306
Contract 120-34-01-11-22

Descriptors: *Electric discharges, *Fuel cells, *Service life, Cesium, Chlorides, Copper oxides, Electrochemistry, Electrolytes, Lithium, Magnesium, Potassium, X ray analysis.

For abstract, see STAR 06 10.
N68-20344 HC$3.00 MF$0.65

A 1.5 KW INVERTER FOR 110 VOLTS, 3 PHASE AT 400 CYCLES.
New Zealand. Dept. of Scientific and Industrial Research, Wellington. Physics and Engineering Lab.
M. J. Beale, A. R. Morman, and R. A. Morris. 1967, 10p TN-199

Descriptors: *Electric generators, *Inverters, *Phase shift circuits, *Power supply circuits, *Transistor circuits, Current amplifiers, Oscillators, Shift registers, Timing devices.

For abstract, see STAR 06 10.
N68-20492 HC$3.00 MF$0.65

OUTLINE OF PLAN FOR ENGINEERING STUDIES REFERENCE PLANT CYCLE SELECTION AND SELECTION OF PLANT STEAM CONDITIONS.
Newport News Shipbuilding and Dry Dock Co., Va. Engineering Technical Dept.
For primary bibliographic entry see Field 13J.
PB-177 849 HC$3.00 MF$0.65

PRELIMINARY PLANT DESIGN STUDY AND COMPONENT SELECTION.
Newport News Shipbuilding and Dry Dock Co., Va. Engineering Technical Dept.
For primary bibliographic entry see Field 13J.
PB-177 850 HC$3.00 MF$0.65

MAIN PLANT CONTROL SYSTEM.
Newport News Shipbuilding and Dry Dock Co., Va. Engineering Technical Dept.
For primary bibliographic entry see Field 13J.
PB-177 851 HC$3.00 MF$0.65

PRELIMINARY OVERALL PLANT DESIGN SELECTION.
Newport News Shipbuilding and Dry Dock Co., Va.
For primary bibliographic entry see Field 13J.
PB-177 852 HC$3.00 MF$0.65

DEVELOPMENT OF FINAL DETAILED STEAM PLANT HEAT BALANCE AND COMPONENT SELECTION.
Newport News Shipbuilding and Dry Dock Co., Va. Engineering Technical Dept.
For primary bibliographic entry see Field 13J.
PB-177 853 HC$3.00 MF$0.65

FINAL CONTROL SELECTION.
Newport News Shipbuilding and Dry Dock Co., Va. Engineering Technical Dept.
For primary bibliographic entry see Field 13J.
PB-177 854 HC$3.00 MF$0.65

CASUALTY ANALYSIS, MANNING ANALYSIS AND MACHINERY SPACE ARRANGEMENTS.
Newport News Shipbuilding and Dry Dock Co., Va. Engineering Technical Dept.
For primary bibliographic entry see Field 13J.
PB-177 855 HC$3.00 MF$0.65

SUMMARY REPORT.
Newport News Shipbuilding and Dry Dock Co., Va. Engineering Technical Dept.
For primary bibliographic entry see Field 13J.
PB-177 856 HC$3.00 MF$0.65

OUTLINE SPECIFICATIONS.
Newport News Shipbuilding and Dry Dock Co., Va. Engineering Technical Dept.
For primary bibliographic entry see Field 13J.
PB-177 857 HC$3.00 MF$0.65

10C. Energy Storage

DEVELOPMENT OF SECONDARY CADMIUM-OXYGEN CELLS FOR SPACECRAFT APPLICATIONS QUARTERLY REPORT, 1 JUL. - 30 SEP. 1967.
Union Carbide Corp., Parma, Ohio. Research Lab.
30 Sep 67, 30p NASA-CR-93835, QR-2
Contract NAS5-10384

Descriptors: *Cadmium, *Electric batteries, *Electrical properties, *Oxygen, *Spacecraft power supplies, Cell cathodes, Construction, Environmental tests, Failure, Life (durability), Low temperature tests, Polarization (charge separation).

For abstract, see STAR 06 10.
N68-19913 HC$3.00 MF$0.65

ELECTROCHEMICAL CHARACTERIZATION OF NONAQUEOUS SYSTEMS FOR SECONDARY BATTERY APPLICATION QUARTERLY REPORT, NOV. 1967 - JAN. 1968.
Whittaker Corp., San Diego, Calif. Narmco Research and Development Div.
D. A. Lufkin, O. A. Paez, A. H. Remanick, and M. Shaw. 16 Feb 68, 90p NASA-CR-72377, QR7
Contract NAS3-8509

Descriptors: *Acceptability, *Electrochemistry, *Storage batteries, Cadmium, Cobalt, Copper, Electric equipment tests, Electrochemical cells, Evaluation, Indium, Iron, Molybdenum, Silver, Vanadium, Zinc.

For abstract, see STAR 06 10.
N68-20012 HC$3.00 MF$0.65

11. MATERIALS

11A. Adhesives and Seals

PERFORMANCE AND ANALYSIS OF SEALS FOR INERTED LUBRICATION SYSTEMS OF TURBINE ENGINES.
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
R. L. Johnson, W. R. Loomis, and L. P. Ludwig. 1968, 37p NASA-TM-X-52413
Conf- Presented At Gas Turbine Conf. and Prod. Show, Washington, D. C., 17-21 Mar. 1968, Sponsored By the Am. Soc. of Mech. Engr.

Descriptors: *Ball bearings, *Gas lubricants, *Lubrication systems, *Performance tests, *Turbine engines, Inertia, Nitrogen, Seals (stoppers), Space environment simulation.

For abstract, see STAR 06 10.
N68-19861 HC$3.00 MF$0.65

ADHESIVE BONDING OF STAINLESS STEELS INCLUDING PRECIPITATION-HARDENING STAINLESS STEELS.
National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.

For primary bibliographic entry see Field 13H.
For abstract, see STAR 06 10.
N68-20056 HC$3.00 MF$0.65

FASTENING OF WOOD-PLASTIC COMBINATIONS.
West Virginia Univ., Morgantown. Engineering Experiment Station.
For primary bibliographic entry see Field 13E.
For abstract, see NSA 22 08.
ORO-2945-9 HC$3.00 MF$0.65

11B. Ceramics, Refractories, and Glasses

FIBERGLASS STRENGTH MEMBER PROCUREMENT SPECIFICATION,
Boeing Co., Seattle, Wash.
For primary bibliographic entry see Field 13F.
AD-443 393 HC$3.00

PYROLYTIC DECOMPOSITION STUDIES OF TETRAETHOXYSILANE FOR OBTAINING HIGH-GRADE SiO2 FILMS.
Army Electronics Command Fort Monmouth N J
For primary bibliographic entry see Field 7A.
AD-667 897 HC$3.00 MF$0.65

EVALUATION OF A VIBRATING SPADE TO ELIMINATE SURFACE VOIDS ON FORMED CONCRETE SURFACES.
Technical rept.,
Army Engineer Waterways Experiment Station Vicksburg Miss
B. J. Houston. Mar 68. 25p Rept no. AEWES-TR-6-816

Descriptors: (*Concrete, Surface properties), (*Vibrators (Mechanical), Concrete), Air, Bubbles, Surfaces, Effectiveness, Design, Vacuum, Molding, Absorption, Mixtures.
Identifiers: Aggregates (Materials), *Vibrating spades.

Surface voids on formed concrete surfaces are normally caused either by air bubbles trapped between the form and concrete and/or by angular coarse aggregate interlocking and preventing mortar from filling the cavity. Structurally, such voids are not objectionable except as they might cause cavitation forces in fast-moving water; but in many cases they are objectionable on aesthetic grounds. In this investigation, two flat, flexible, vibrating spades, designed to be inserted between the freshly placed concrete and the forms to release entrapped air bubbles, were evaluated. During operation both spades were attached to a standard internal vibrator. One of the spades was designed so that a low-magnitude vacuum could be applied through its flat surfaces to aid in withdrawing entrapped air. To investigate the effectiveness of the spades, similar batches of concrete were made and each was placed in a form designed to produce a sloping and a vertical concrete test surface. All the concrete specimens were initially consolidated in the molds in a similar manner with an internal vibrator. Control specimens received only this initial consolidation, while the vertical and sloping test surfaces of the others were spaded to varying degrees. (Author)
AD-667 967 HC$3.00 MF$0.65

EXPERIMENTAL INVESTIGATIONS OF THE BEHAVIOR OF BRITTLE MATERIALS AT VARIOUS RANGES OF TEMPERATURE.
Annual scientific summary, 1 Apr 65-30 Sep 66.
Technische Hochschule Munich (West Germany) Institut Fuer Technische Mechanik
Heinz Neuber, and Anton Wimmer. 31 Oct 66, 107p
AFML-TR-68-23
Contract AF 61 (052)-875

Descriptors: (*Ceramic materials, Mechanical properties), (*Alumina, Mechanical properties), Magnesium oxides, Zirconium oxides, Spinels, Modulus of elasticity, Stresses, Strain (Mechanics), Fracture (Mechanics), Bending, Porosity, Microstructure, Tables, West Germany.

Young's modulus, the fracture stress and the fracture strain (strain at fracture) of Alumina (Al2O3) were determined in a temperature range from -200C to 1200C by bending tests and the influence of the porosity, the grain size, the strain rate, the specimen diameter and length on these quantities was investigated. The bending tests were also extended in the same temperature range to other oxide ceramic materials like Magnesia (MgO), Zirconia (ZrO2) and Spinel (Al2O3 . MgO). Temperature treatments were undertaken on Alumina specimens in the temperature range from 1000C to 1600C and the change of the porosity and the grain size was observed. Bending tests were carried out for the determination of Young's modulus for tension and compression. (Author)
AD-668 148 HC$3.00 MF$0.65

THE SYSTEM ZIRCONIA-HAFNIA.
Revised ed.,
Illinois Univ Chicago
Robert Ruh, H. J. Garrett, R. F. Domagala, and N. M. Tallan. 16 Aug 67. 9p
ARL-68-0046
Contract AF 33 (616)-7074
Presented at the Annual Meeting, The American Ceramic Society (67th), Philadelphia, Pa., 5 May 65. Revision of report dated 15 Feb 67.
Availability: Published in American Ceramic Society, v51 n1 p23-7 Jan 1968.

Descriptors: (*Refractory materials, Phase studies), (*Zirconium oxides, Solid solutions), (*Hafnium compounds, Solid solutions), Oxides, Metallography, X-ray diffraction analysis, Melting point, Differential thermal analysis, Crystal lattices, Crystal structure, Phase diagrams.
Identifiers: Hafnium oxides.

The ZrO2-HfO2 system was investigated by metallographic, X-ray diffraction, and microprobe analysis using arc-melted samples which had been annealed and quenched. The monoclinic-tetragonal inversion was investigated by DTA and high-temperature X-ray diffraction analysis. Results reveal that zirconia and hafnia are completely miscible in all proportions in the binary system. Within experimental error, the melting points of the compositions lie roughly on a straight line connecting the melting points of oxides. There is a continuous increase in the monoclinic-tetragonal inversion temperature as the composition moves from ZrO2 to HfO2. The lattice parameters of the monoclinic phase follow smooth curves which have a negative deviation from Vegard's law. (Author)
AD-668 366 Not available from CFSTI.

A REVIEW OF GLASSLIKE CARBONS,
Battelle Memorial Inst Columbus Ohio Defense Ceramic Information Center
Shigehiko Yamada. Apr 68. 54p Rept no. DCIC-68-2
Contract F33615-67-C-1472

Descriptors: (*Carbon, Reviews), Glass, Preparation, Material forming, Crystal structure, Molecular structure, Chemical properties, Mechanical properties, Carbon fibers.
Identifiers: *Glasslike carbon.

A relatively new group of carbons having several characteristics resembling glass is of sufficient interest in connection with technological demands for improved materials to prompt this report. The generic term 'glasslike' is appropriate for these carbons because they exhibit a glassy surface appearance, conchoidal fracture, internal-friction characteristics resembling glass more closely than normal graphite, and gas impermeability comparable to glass. The structure of glasslike carbons is not well understood; it resists change by graphitization at temperatures up to about 3000C. The report reviews the preparation, formation mechanisms, structure, properties, and applications of glasslike carbons. The unique combination of properties and resulting potential applications has stimulated manufacture of glasslike carbons by several companies. Available property data on the various products are included.
AD-668 465 HC$3.00 MF$0.65

THERMAL CONDUCTIVITY OF SELECTED MATERIALS. PART 2,
National Standard Reference Data System.
For primary bibliographic entry see Field 20M.
NSRDS-NBS-16-Pt-2 HC$2.00 MF$0.65

PLANT REQUIREMENTS FOR MANUFACTURE OF CEMENT.
Agency for International Development, Washington, D. C. Communications Resources Div.
For primary bibliographic entry see Field 13H.
PB-177 936 HC$3.00 MF$0.65

PLANT REQUIREMENTS FOR MANUFACTURE OF READY-MIXED CONCRETE.
Agency for International Development, Washington, D. C. Communications Resources Div.
For primary bibliographic entry see Field 13H.
PB-177 937 HC$3.00 MF$0.65

11C. Coating, Colorants, and Finishes

ORGANIC COATINGS: PROPERTIES, SELECTION, AND USE.
Building Science Series,
National Bureau of Standards, Washington, D. C. Building Research Div.
Aaron Gene Roberts. Feb 68. 204p
Hard copy available from Superintendent of Documents, G.P.O., Washington, D. C. 20304, $2.50.

Descriptors: (*Organic coatings, Reviews), Varnishes, Plastic paints, Rubber coatings, Bituminous coatings, Paint primers, Selection, Storage, Safety, Corrosion inhibition, Fire resistant coatings, Specifications, Pigments, Surfaces, Processing, Test methods.

This publication was prepared to fill the need for a comprehensive, unifying treatise in the field or organic coatings. Besides presenting practical information on the properties, selection, and use of organic coatings (and certain inorganic coatings), it provides basic principles in a number of important areas such as polymer structure, coatings formulation, pigment function, use of thinners, coating system compatibility, and theory of corrosion. Each chapter deals with a major area of the coatings field including types of coatings, properties of synthetic resins, selection of coating systems, storage and safety, application methods, and surface preparation and pretreatment. There is also a consolidating chapter with illustrative examples of solutions to typical coating problems. Interrelationships among the various areas of information are indicated through appropriate cross-referencing in the text. Specific references to Federal, Military, and other specifications are given where pertinent, and an entire chapter is devoted to a quick guide and summary of Federal specifications for organic coating materials. Finally, a selected bibliography and a comprehensive index are provided. While written primarily to meet the informational needs of the engineer, architect, maintenance superintendent, and responsible coatings procurement officer, the treatise is sufficiently broad in scope to serve as a general manual, a concise text, or a convenient reference source in the field of organic coatings. (Author)
NBS-BSS-7 HC$2.50 MF$0.65

PLANT REQUIREMENTS FOR MANUFACTURE OF PORCELAIN ENAMELWARE.
International Cooperation Administration, Washington, D. C. Technical Aids Branch.
For primary bibliographic entry see Field 13H.
PB-177 931 HC$3.00 MF$0.65

11D. Composite Materials

INVESTIGATION OF MICROMECHANICAL BEHAVIOR OF FIBER REINFORCED PLASTICS.
Final rept. 14 Jun 66-14 Mar 67,
Whittaker Corp San Diego Calif Narmco Research and Development Div
Juan Haener, Noel Ashbaugh, Chuen-Yuan Chia, and Ming-Yuan Feng. Feb 68, 233p
USAAVLABS-TR-67-66
Contract DA-44-177-AMC-441 (T)

Descriptors: (*Reinforced plastics, Mechanical properties), Stresses, Shrinkage, Loading (Mechanics), Elasticity, Reinforcing materials, Glass textiles, Boron, Fibers, Epoxy plastics, Buckling (Mechanics), Airframes.

The stress fields in the components of a unidirectional composite due to shrinkage and external loads are computed for 20 matrix/reinforcement combinations having various volumetric contents. Further, the load transmissions between loaded and unloaded fibers are formulated as three-dimensional elasticity solutions. The instability problem of a composite is treated by both the static and the energy method, resulting in critical loads and buckling wavelengths which depend on material constants and geometries. The theoretical results are in good agreement with experiments. The work reported herein encompasses the following principal areas: (1) parametric studies (internal stresses and displacements computed for unidirectional composites comprised of different matrices and reinforcements combinations and different volumetric contents); (2) three-dimensional load transfer among loaded and unloaded fibers in a matrix; (3) buckling of fibers in a matrix under axial load as an elasticity solution; (4) the buckling of fibers in a matrix under axial load, solved with the Ritz-Galerkin method; and (5) buckling of fibers in a matrix due to matrix shrinkage. (Author)
AD-667 901 HC$3.00 MF$0.65

THE POTENTIALS OF COMPOSITE STRUCTURES IN THE DESIGN OF AIRCRAFT.
Advisory Group for Aerospace Research and Development Paris (France)
For primary bibliographic entry see Field 1C.
AD-668 253 HC$3.00 MF$0.65

INVARIANT PROPERTIES OF COMPOSITE MATERIALS.
Monsanto Research Corp St Louis Mo
Stepehn W. Tsai, and Nicholas J. Pagano. 1967, 23p Rept no. HPC-67-31
Contract N00014-67-C-0218, ARPA Order-873
Report on Monsanto/Washington Univ., ARPA Association project development of High Performance Composites.
Availability: Published in Composite Materials Workshop p234-53 1967.

Descriptors: (*Composite materials, Performance (Engineering)), Metals, Stresses, Flexural strength, Mechanical properties, Laminates, Mathematical analysis, Structural properties, Measurement, Design, Structures, Manufacturing methods, Fibers, Modulus of elasticity, Tables.

The superior performance of composite materials over light-weight metals has been well publicized in recent years. Composites have been claimed to posses improvements in stiffness and in strength of several fold over ordinary materials. The claim, however, is based on either the properties of the fibers alone or the longitudinal properties of a unidirectional composite against those of the metals. In this work, the transformation properties of unidirectional and laminated composites are derived in terms of multiple angles, instead of the classical relations using powers of sines and cosines. The effect of lamina orientation is then examined. It is shown that the invariant properties of both the unidirectional and laminated composites have the same components, and can be used as an effective measure of the performance of the composites. Simple formulas are derived, from which the invariant properties of composites, irrespective of the lamina orientation, can be determined from the properties of the constituents. This work should be of value to system analysts who must evaluate the performance of composites, to structural designers who must establish a rational design procedure, and to materials engineers who may need guidance in the selection and fabrication of composite materials. (Author)
AD-668 280 Not available from CFSTI.

APPLICATION OF THE PLATE TWIST TEST TO LAMINATED COMPOSITES.
Technical rept. Jun-Sep 67,
Air Force Materials Lab Wright-Patterson AFB Ohio
James M. Whitney. Mar 68, 20p Rept no. AFML-TR-67-407

Descriptors: (*Laminates, Test methods), Composite materials, Reinforced plastics, Epoxy plastics, Reinforcing materials, Glass textiles, Boron, Fibers, Shear stresses, Measurement.

The laminated plate theory is used to show that the applicability of the plate twist test for measuring shear modulus of laminated fiber-reinforced composites is limited to cross-ply layups and unsymmetric angle-ply layups. Numerical examples for symmetric plus or minus 45-degree boron-epoxy and glass-epoxy composites are used to illustrate the magnitude of the error generated when this test is used incorrectly. Results show errors of over 100% can occur. It is also concluded from laminated plate theory that the shear modulus for angle-ply composites can be considerably higher than the shear modulus of a unidirectional ply oriented at an angle of zero degrees to the plate axes. For example, the shear modulus of each layer of a plus or minus 45-degree boron-epoxy angle-ply composite containing 70% fiber by volume is approximately 3,500,000 PSI, while the composite shear modulus is 10,500,000 PSI. (Author)
AD-668 477 HC$3.00 MF$0.65

EXPERIMENTAL AND THEORETICAL INVESTIGATION OF THE ABLATIVE PERFORMANCE OF FIVE PHENOLIC-NYLON-BASED MATERIALS.
National Aeronautics and Space Administration. Langley Research Center, Langley Station, Va.
A. G. Mc Lain, K. Sutton, and G. D. Walberg.
Apr 68, 32p NASA-TN-D-4374
Contract 124-08-03-05-23

Descriptors: *Ablative materials, *Phenolic resins, *Polyamide resins, *Thermal conductivity, Arc heating, Heat shielding, Test facilities.

For abstract, see STAR 06 10.
N68-19710 HC$3.00 MF$0.65

WEAR RATE AND FRICTION COEFFICIENT IN LIQUID NITROGEN AND HYDROGEN OF STEEL SLIDING ON POLYMER LAMINATES (VARIOUS FABRICS AND POLYMERS).
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
For primary bibliographic entry see Field 13I.
For abstract, see STAR 06 10.
N68-20325 HC$3.00 MF$0.65

FASTENING OF WOOD-PLASTIC COMBINATIONS.
West Virginia Univ., Morgantown. Engineering Experiment Station.
For primary bibliographic entry see Field 13E.
For abstract, see NSA 22 08.
ORO-2945-9 HC$3.00 MF$0.65

11E. Fibers and Textiles

THE MECHANICS OF RUPTURE OF COTTON-DACRON BLENDED YARNS.
Technical rept.,
Army Natick Labs Mass General Equipment and Packaging Lab
Constantin J. Monego. Jul 67, 239p
USA-NLBS-TR-68-16-GP

Descriptors: (*Cotton textiles, Rupture), (*Dacron, Rupture), Tensile properties, Fibers, Elongation, Strain (Mechanics), Strength, Mathematical models.
Identifiers: *Blended yarns.

The tensile behavior of cotton-Dacron blends was studied in a twisted model yarn structure composed of Dacron filament yarns (70 denier, 34 filament) and combed cotton staple yarns (79 cotton content (c.c.)) in blend ratios of 1.1, 2.2, 11, 22, 33, 44, 56, 67, and 89 percent cotton content. The contribution of the cotton component to the blended structure at all strain levels is the main subject of the study. The report covers the experimental studies on the load extension characteristics of 72 model yarns at elongations of 5 percent through break and the effect of twist (0.55 twist multiple (TM) through 4.4 TM), blend ratio and position of the cotton component in the yarn (cotton core or cotton shell) on the strength of the blended yarn are discussed. These studies extend Machida's theoretical approach to the problem of blended yarn strength to include cotton-Dacron blended yarns in blend ratios of practical significance. (Author)
AD-667 931 HC$3.00 MF$0.65

MEN'S WORK SHIRTS. CAPITAL REQUIREMENTS, TECHNIQUES AND OPERATIONS.
International Cooperation Administration, Washington, D. C. Technical Aids Branch.
For primary bibliographic entry see Field 13H.
PB-177 915 HC$3.00 MF$0.65

PLANT REQUIREMENTS FOR MANUFACTURE OF MEN'S SOCKS.
International Cooperation Administration, Washington, D. C. Technical Aids Branch.
For primary bibliographic entry see Field 13H.
PB-177 921 HC$3.00 MF$0.65

PLANT REQUIREMENTS FOR MANUFACTURE OF TERRY CLOTH.
International Cooperation Administration, Washington, D. C. Technical Aids Branch.
For primary bibliographic entry see Field 13H.
PB-177 924 HC$3.00 MF$0.65

PLANT REQUIREMENTS FOR MANUFACTURE OF WORSTED YARNS.
International Cooperation Administration, Washington, D. C.
For primary bibliographic entry see Field 13H.
PB-177 927 HC$3.00 MF$0.65

PLANT REQUIREMENTS FOR MANUFACTURE OF STRETCH SOCKS FOR MEN AND CHILDREN.
International Cooperation Administration, Washington, D. C. Technical Aids Branch.
For primary bibliographic entry see Field 13H.
PB-177 935 HC$3.00 MF$0.65

SILK SCREEN PRINTING ON TEXTILES.
International Cooperation Administration, Washington, D. C. Office of Industrial Resources.
For primary bibliographic entry see Field 14E.
PB-177 946 HC$3.00 MF$0.65

11F. Metallurgy and Metallography

STRAIN EFFECTS IN DILUTE ALLOYS.
Technical rept.,
California Univ San Diego La Jolla Dept of Physics
M. T. Beal-Monod, and W. Kohn. 1 Mar 68, 39p
Rept no. TR-52
Contract Nonr-2216 (11)

See also AD-636 777. Research supported in part by NSF.

Descriptors: (*Continuum mechanics, Solid solutions), (*Metals, *Impurities), Mathematical models, Strain (Mechanics), Ionization potentials, Displacement reactions, Resistance (Electrical), Electrostatic fields, Alloys, Charged particles, Crystal lattices, Electron density, Approximation (Mathematics), Poissons ratio, Interference, Scattering, Momentum, Phase shift, Copper, Germanium.
Identifiers: Graphs (Charts), Dilute alloys (Impurities), Born approximations.

Impurities in metals give rise to residual resistivity and to electric field gradients. This paper deals with the contribution to these effects by those host ions which are slightly displaced by the impurities. The calculations treat these ions as discrete and give results which are entirely at variance with those of earlier continuum theories. (Author)
AD-668 023 HC$3.00 MF$0.65

ROLLING OF METAL POWDERS,
Foreign Technology Div Wright-Patterson AFB Ohio
G. A. Vinogradov, and Yu. N. Semenov. 23 Jun 67, 94p Rept no. FTD-MT-67-67
Edited machine trans. mono. Prokatka Gallicheskikh Poroshkov, Moscow, 1960 88p.

Descriptors: (*Rolling (Metallurgy), *Powder metallurgy), Sheets, Theory, Rolling mills, Cermets, Iron, Nickel alloys, Stainless steel, Copper, Titanium, Microstructure, Mechanical properties, USSR.
Identifiers: Translations.

The book published in 1960 assembles and condenses current information on powder metallurgy and its possible applications to production heretofore achieved by casting methods. Roll compacting information has been collected from a wide range of sources and an attempt is made to synthesize the total knowledge in general terms. The book includes descriptions of flow diagrams, equipment for roll compacting, and the properties of rolled cermet materials.
AD-668 029 HC$3.00 MF$0.65

PECULIARITIES OF REFINING AND HARDENING OF METAL DURING ELECTROSLAG REMELTING,
Foreign Technology Div Wright-Patterson AFB Ohio
V. V. Panin, S. A. Iodkovskii, and R. M. Novitskaya. 14 Sep 67, 20p Rept no. FTD-MT-24-120-67
Edited machine trans. of mono. Vsesoyuznoe Nauchno-Tekhnicheskoe Soveshchanie po Voprosam Vyplavki Stali dlya Fasonnykh Otlivok. Trudy, n.p., 1963 p240-55.

Descriptors: (*Refining (Metallurgy), Steel), Slags, Melting, Impurities, Crystallization, Defects (Materials), Adsorption, Sulfur, Hardening, Castings, USSR.
Identifiers: Electroslag process, Translations.

The mechanisms of the steel refining in electroslag melting were investigated. The desulfurizing process occurs during the period in which the electrode is melted and drops of the metal are formed. Non-metallic impurities are separated from the metal by adsorption of the slag, and not by rising to the surface during metal crystallization. Corundum in an acid slag provided little purification. CaF2 significantly reduced impurities. More pure metal was obtained with ANF-6 slag. Work was done to determine favorable conditions for metal crystallization in the water cooled crystallizer to obtain ingot with minimum number of defects. The depth of the metal bath and rate of melting of the ingot affect the crystal growth: experiments confirmed earlier works that with slow melting and low bath depths, crystal growth is almost axial, and with increase in these factors, radial growth and formation of cavities arises. An extensive study was conducted of the heat flow in the melt and crystallizer. There is a direct relationship between the temperature of the slag and the depth of the metal bath; the heat losses through the tray, in the water-cooling system and by heat accumulation in the ingot are very small; most of the heat flow is through the walls. There is almost a direct relationship between the depth of the metal bath and the flow of heat introduced into the bath by the metal drops. Isotherms were drawn showing the difference in heat distributions in the electroslag melted ingots resulting from heat from the slag only, and from heat introduced by the metal drops.
AD-668 059 HC$3.00 MF$0.65

CORROSION OF METALS AND ALLOYS, No. 2, 1965: SELECTED ARTICLES.
Foreign Technology Div Wright-Patterson AFB Ohio
25 Aug 67, 72p Rept no. FTD-MT-24-99-67
Trans. of Korroziya Metallov i Splavov (USSR) n2 p80-102, 136-47, 305-14, 332-50 1965.

Descriptors: (*Corrosion, Reports), Titanium, Electrochemistry, Voltage, Anodic coatings, Sulfuric acid, Titanium compounds, Oxides, USSR, Titanium alloys, Phosphoric acids, Corrosion inhibition, Ammonia, Steel, Ionization, Hydrolysis, Air pollution, Zinc, Copper, Cadmium, Aluminum.
Identifiers: Translations.

Contents: Investigation of electrochemical behavior of titanium; Corrosional and electrochemical behavior of titanium and its alloys in wet-process phosphoric acid; Mechanism of protection of metals from corrosion with ammonia; Atmospheric corrosion of steel, zinc, cadmium, copper, and aluminum in various maritime and continental regions.
AD-668 094 HC$3.00 MF$0.65

NEWS OF INSTITUTIONS OF HIGHER LEARNING, NO. 5, 1966: SELECTED ARTICLES,
Foreign Technology Div Wright-Patterson AFB Ohio
Yu. I. Afanasev, Yu. M. Kamenskii, B. N. Sukhotin, A. N. Dubrovina, and Ya. S. Umanskii. 14 Sep 67, 20p Rept no. FTD-MT-24-176-67
Edited machine trans. of Izvestiya Vysshikh Uchebnykh Zavedenii. Chernaya Metallurgiya (USSR) n5 p73-7, 104-3 1966.

Descriptors: (*Metallurgy, USSR), Melting, Recrystallization, Nickel alloys, Molybdenum alloys, Deformation, Arc melting, Heat treatment, X-ray diffraction analysis, Non-destructive testing, Crystal lattice defects, Phase diagrams.
Identifiers: Translations.

Contents: Certain questions of crystallization of ingot of electroslag remelting; and Character of structural transformation in deformed alloy Ni + 10% (at.) Mo.
AD-668 102 HC$3.00 MF$0.65

ELECTROCHEMICAL CORROSION STUDIES OF GALVANICALLY COUPLED SNAP-21 MATERIALS,
Naval Radiological Defense Lab San Francisco Calif
For primary bibliographic entry see Field 18N.
AD-668 161 HC$3.00 MF$0.65

DAMPING IN DEFORMED IRON CONTAINING INTERSTITIAL IMPURITIES.
Technical rept.,
Columbia Univ New York Henry Krumb School of Mines
Birendra N. Agarwala. 15 Mar 68, 145p Rept no. TR-10
Contract Nonr-266 (61)

Descriptors: (*Internal friction, Iron alloys), (*Crystal lattice defects, Iron alloys), Deformation, Strain (Mechanics), Plasticity, Recrystallization, Cold working, Annealing, Dislocations, Temperature, Carbon alloys, Theses.
Identifiers: Interstitial atoms, Snoek peak.

The internal friction spectrum in polycrystalline iron has been studied around 1 Hz from -60 degrees C to 380 degrees C as a function of deformation, interstitial content, state of annealing, strain amplitude and the temperature at which the recrystallization is carried out prior to deformation. Plastic deformation produces two major peaks centered at 47 degrees C (peak D) and at temperature range between 220 degrees C to 290 degrees C (cold-work peak). The features of peak D are explained by a model based on enhanced Snoek relaxation, with strong harmonic generation, caused by the motion of the dislocations. In a dilute iron-carbon alloy the cold-work peak initially rises and then falls with increasing deformation. The peak temperature in the same specimen drops with increasing deformation. In the iron-carbon system Schoeck's theory based on dislocation motion giving rise to the anelastic strain can explain the observed features of the cold-work peak. The rising background damping occurring at the higher temperature side near the cold-work peak is observed to be sensitive to the degree of deformation, amount of solute content and the state of annealing. (Author)
AD-668 173 HC$3.00 MF$0.65

RESEARCH IN MATERIALS SCIENCE AND ENGINEERING.
Massachusetts Inst of Tech Cambridge
For primary bibliographic entry see Field 11G.
AD-668 215 HC$3.00 MF$0.65

DEVELOPMENT OF PRACTICE FOR COMPOSITE ROLLING OF STRUCTURAL METAL PANELS.
Battelle Memorial Inst Columbus Ohio Columbus Labs
For primary bibliographic entry see Field 13H.
AD-668 244 HC$3.00 MF$0.65

THE INTERACTION OF INTERSTITIAL IMPURITIES WITH DISLOCATIONS IN IRON,
Columbia Univ New York Henry Krumb School of Mines
D. N. Beshers. 1968, 5p
Availability: Published in Journal of Metals, p1-5 Feb 1968.

Descriptors: (*Iron, Crystal lattice defects), (*Crystal lattice defects, Interactions), Dislocations, Aging (Materials), Carbon, Nitrogen, Internal friction, Annealing, Quenching (Cooling), Deformation, Transport properties, Cold working, Solid solutions, State-of-the-art reviews.
Identifiers: Interstitial impurities, Snoek peak.

The author presents a state-of-the-art review of findings and theories concerning the title problem.
AD-668 286 Not available from CFSTI.

THE OXIDATION OF ALUMINUM FILMS IN LOW-PRESSURE OXYGEN ATMOSPHERES.
Massachusetts Inst of Tech Lexington Lincoln Lab
For primary bibliographic entry see Field 7D.
AD-668 306 Not available from CFSTI.

LEED STUDY OF THE GROWTH OF ALUMINUM FILMS ON THE Ta (110) SURFACE.
Systems Research Labs Inc Dayton Ohio
For primary bibliographic entry see Field 20B.
AD-668 375 Not available from CFSTI.

NOTE ON FATIGUE MECHANISM IN fcc METALS AT ULTRASONIC FREQUENCIES.
Technical rept.,
Columbia Univ New York Dept of Civil Engineering and Engineering Mechanics

W. P. Mason, and W. A. Wood. Mar 68, 22p
Rept no. TR-59
Contract Nonr-266 (91)

Descriptors: (*Copper, Fatigue (Mechanics)), (*Brass, Fatigue (Mechanics)), (*Fatigue (Mechanics), Crystal structure), Crack propagation, Strain (Mechanics), Dislocations, Ultrasonic radiation, Transport properties, Grain boundaries, Internal friction, High-temperature research.
Identifiers: Microstructure.

A comparison is made of microstructural changes leading to fatigue of copper and alpha-brass at small strain-amplitudes imposed at the normal test frequency of 1700 cpm and at the ultra-sonic frequency of 1700 cps. A striking difference appears in the distribution of slip. At normal frequency the slip spreads densely over a grain, with no slip-band cracking (stage S of the S/N curve). At ultrasonic frequency the slip concentrates in single isolated bands in only occasional grains and reduces these to microcracks before any general spread of slip can be observed. However, as might be expected, the ultra-sonic slip did spread in specimens tested at elevated temperatures which expedited dislocation climb and diffusion processes; then this spreading of slip prevented the slip-band microcracking at ultra-sonic frequency also. (Author)
AD-668 499 HC$3.00 MF$0.65

ELASTIC MODULI AND ULTRASOUND VELOCITIES OF TUNGSTEN AS A FUNCTION OF TEMPERATURE,
Argonne National Lab., Ill.
Ronald G. Peterson. Dec 67, 10p
Contract W-31-109-eng-38

Descriptors: (*Modulus of elasticity, Tungsten), (*Ultrasonic properties, Tungsten), (*Tungsten, High-temperature research), Mechanical waves, Poissons ratio, Shear stresses.
Identifiers: Pulse echo method, Young's modulus, Shear modulus.

For abstract, see NSA 22 08.
ANL-7272 HC$3.00 MF$0.65

THE DEVELOPMENT OF A DESIGN AND FABRICATION METHOD FOR PLUTONIUM-BEARING ZERO-POWER REACTOR FUEL ELEMENTS,
Argonne National Lab., Ill.
For primary bibliographic entry see Field 18J.
For abstract, see NSA 22 08.
ANL-7313 HC$3.00 MF$0.65

SUMMARY TECHNICAL REPORT FOR THE PERIOD OCTOBER 1-DECEMBER 31, 1967,
National Lead Co. of Ohio, Cincinnati.
R. Burgett. Feb 68, 22p
Contract AT (30-1)-1156

Descriptors: (*Alloys, Material forming), Uranium, Vacuum apparatus, Carbon, Temperature, Molding, Casting, Luminescence, Furnaces, Carbides, Mathematical analysis, Hardness, Tables.

For abstract, see NSA 22 08.
NLCO-1010 HC$3.00 MF$0.65

THERMAL CONDUCTIVITY OF SELECTED MATERIALS. PART 2,
National Standard Reference Data System.
For primary bibliographic entry see Field 20M.
NSRDS-NBS-16-Pt-2 HC$2.00 MF$0.65

INVESTIGATION OF STRESS CORROSION CRACKING OF TITANIUM ALLOYS SEMIANNUAL PROGRESS REPORT, 1 JUN. - 30 NOV. 1966.
Mellon Inst., Pittsburgh, Pa.
E. G. Haney. 30 Nov 66, 25p NASA-CR-80326, SAPR-1
Contract NGR-39-008-014

Descriptors: *Crack initiation, *Metal foils, *Stress corrosion, *Titanium alloys, Crack propagation, Electrochemistry, Electrodes, Failure, Loads (forces), Passivity, Water.

For abstract, see STAR 06 10.
N68-19542 HC$3.00 MF$0.65

OPTIMIZATION AND EVALUATION OF ELECTROPHORETIC PROTECTIVE COATINGS FOR TANTALUM T-222 ALLOY FINAL SUMMARY REPORT, 1 JUL. 1966 - 27 OCT. 1967.
Vitro Labs., West Orange, N. J.
S. J. Klach, and M. H. Ortner. Dec 67, 208p
NASA-CR-72358
Contract NAS3-9405

Descriptors: *Oxidation resistance, *Protective coatings, *Silicides, *Tantalum alloys, Electrophoresis, High temperature tests, Optimization, Reliability, Siliconizing, Thickness.

For abstract, see STAR 06 10.
N68-19623 HC$3.00 MF$0.65

INTERDISCIPLINARY MATERIALS RESEARCH INCLUDING FUNDAMENTAL PHYSICS AND CHEMISTRY OF MATERIALS, ENVIRONMENTAL EFFECTS AND RELATED PROBLEMS SEMIANNUAL PROGRESS REPORT, SEP. 1, 1967 - FEB. 29, 1968.
Rnsselaer Polytechnic Inst., Troy, N. Y.
Mar 68, 58p NASA-CR-93718
Grant NSG-100-60

Descriptors: *Inorganic compounds, *Metals, *Polymers, *Solid state physics, Cracking (fracturing), Cryogenics, Dissolving, Electron paramagnetic resonance, Interferometry, Irreversible processes, Mechanical properties, Nuclear magnetic resonance, Precipitation hardening, Pyrolytic materials, Stress corrosion, Thermodynamic properties, Ultrasonics, X ray scattering.

For abstract, see STAR 06 10.
N68-19692 HC$3.00 MF$0.65

EFFECT OF COVER GAS PRESSURES ON ACCELERATED CAVITATION DAMAGE.
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
J. R. Johnston, and S. G. Young. 1968, 33p
NASA-TM-X-52414
Refs Conf- To Be Presented At Am. Soc. for Testing and Mater., Honolulu, Hawaii, 29 Jun.- 3 Jul. 1968

Descriptors: *Cavitation corrosion, *Construction materials, *Liquid metals, *Pressure effects, *Space power unit reactors, *Stainless steels, Cavitation flow, Corrosion resistance, Gas pressure.

For abstract, see STAR 06 10.
N68-19745 HC$3.00 MF$0.65

PROGRESS IN NASA PROGRAMS FOR DEVELOPMENT OF HIGH TEMPERATURE ALLOYS FOR ADVANCED ENGINES.
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
J. C. Freche, and R. W. Hall. 1968, 19p NASA-TM-X-52420
Conf- To Be Presented At Aiaa 6th Intern. Congr. on Aeronautical Sci., Munich, 9-13 Sep. 1968

Descriptors: *Composite materials, *Gas turbine engines, *Heat resistant alloys, *Precipitation hardening, *Protective coatings, Aircraft structures, Construction materials, High temperature.

For abstract, see STAR 06 10.
N68-19787 HC$3.00 MF$0.65

EFFECTS OF ALKALI METAL GETTERING AGENTS ON STAINLESS STEEL CORROSION.
Jet Propulsion Lab., Calif. Inst. of Tech., Pasadena.
W. Phillips. 1 Apr 68, 32p NASA-CR-93727, JPL-TR-32-1239
Contract NAS7-100

Descriptors: *Alkali metals, *Corrosion, *Getters, *Liquid metals, *Stainless steels, Interstitials, Mass transfer, Metallography, Microanalysis, Microhardness, Tensile properties, Yttrium.
For abstract, see STAR 06 10.
N68-19801 HC$3.00 MF$0.65

THERMAL AND MECHANICAL TREATMENT FOR PRECIPITATION-HARDENING STAINLESS STEELS.
National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
For primary bibliographic entry see Field 13H.
For abstract, see STAR 06 10.
N68-20433 HC$3.00 MF$0.65

FLOATING-MANDREL EXTRUSION OF TUNGSTEN AND TUNGSTEN-ALLOY TUBING,
Oak Ridge National Lab., Tenn.
R. E. McDonald, and G. A. Reimann. Feb 68, 28p
Contract W-7405-eng-26

Descriptors: (*Metals, Extrusion), Tungsten, Pipes, Tungsten alloys, Lubrication, Surface properties, Defects (Materials), Microstructure, Powder metallurgy, Manufacturing methods.

For abstract, see NSA 22 08.
ORNL-4210 HC$3.00 MF$0.65

METALS CHARACTERIZATION BY LOW-TEMPERATURE THERMOELECTRIC METHODS,
National Bureau of Standards, Boulder, Colo.
L. L. Sparks, and R. L. Powell. 1967, 3p
Measurements and Data p89-91 Sep-Oct 1967.

Descriptors: (*Metallography, *Thermoelectricity), (*Wire, *Non-destructive testing), Defects (Materials), Thermocouples, Metals, Impurities.

A system is described which permits the determination of the homogeneity of a metal wire by using it as a thermocouple with a known metal.
PB-177 832 HC$3.00 MF$0.65

REPORT OF NRL PROGRESS.
Naval Research Lab., Washington, D. C.
For primary bibliographic entry see Field 14B.
PB-177 877 HC$3.00 MF$0.65

THE SOLUBILITIES OF TRANSITION METALS IN LIQUID ALKALI AND ALKALINE EARTH METALS, LANTHANUM AND CERIUM. A CRITICAL REVIEW OF THE LITERATURE,
California Univ., Livermore. Lawrence Radiation Lab.
Donald F. Anthrop. 20 Sep 67, 92p
Contract W-7405-eng-48

Descriptors: (*Liquid metal coolants, Solubility), Transition elements, Alkali metals, Alkaline earth metals, Lanthanum, Cerium, Reviews.

For abstract, see NSA 22 08.
UCRL-50315 HC$3.00 MF$0.65

DETERMINATION OF SELECTED MECHANICAL AND PHYSICAL PROPERTIES OF CAST VERY-HIGH-ASSAY URANIUM,
Union Carbide Corp., Oak Ridge, Tenn. Y-12 Plant.
D. J. Legacy, and W. J. Yaggi. 29 Jan 68, 21p
Contract W-7405-eng-26

Descriptors: (*Uranium, Mechanical properties), (*Castings, Physical properties), Statistical analysis, Quantitative analysis, Sampling, Grain struc-

tures (Metallurgy), Tensile properties, Compressive properties, Thermal properties, Density, Elongation.

For abstract, see NSA 22 08.
Y-1593 HC$3.00 MF$0.65

11G. Miscellaneous Materials

RESEARCH IN MATERIALS SCIENCE AND ENGINEERING.
Annual rept. 1967-68.
Massachusetts Inst of Tech Cambridge
Apr 68, 395p
See also AD-652 583.

Descriptors: (*Materials, Scientific research), Physical chemistry, Solid state physics, Semiconductor devices, Electrical properties, Magnetic properties, Optical properties, Metallurgy, Engineering, Chemical engineering, Instrumentation, Laboratories, Scientific personnel, Reviews.

Summaries are given of current research projects at MIT in the following areas: Chemical and solid state physics; electric, magnetic, and optical properties and applications to devices; metallurgy and materials science; materials engineering. Special sections are devoted to reviews of work at the Francis Bitter National Magnet Laboratory, Instrumentation Laboratory, Solid State Division of Lincoln Laboratory, and Central Facilities of the Interdisciplinary Laboratory.
AD-668 215 HC$3.00 MF$0.65

RESEARCH ACTIVITIES IN THE FIELD OF MATERIALS SCIENCE.
Technical progress rept. 1 Jul 66-30 Jun 67.
North Carolina Univ Chapel Hill Materials Research Center
30 Jun 67, 65p
Contract SD-100

Descriptors: (*Materials, Scientific research), Complex compounds, Organic compounds, Thermochemistry, Boron compounds, Geochemistry, Semiconductors, Crystallography, Magnetic materials, Superconductors, Metals, Dentistry, Proteins, Prosthetics, Reviews.

The report comprises brief summaries of materials research projects at the University of North Carolina at Chapel Hill for the year ending 30 Jun 1967. The brief reports of progress in the various individual research programs are arranged by Academic Departments and Schools, and within departments alphabetically by the name of the principal investigator.
AD-668 501 HC$3.00 MF$0.65

LEATHER CHEMISTRY FOR FOREMEN. FIRST YEAR COURSE.
Agency for International Development, Washington, D. C. Communications Resources Div.
1962, 121p Training Manual-119
Prepared in cooperation with Lawrence (A. C.) Leather Co., Peabody, Mass. and Lowell Technological Institute, Mass.

Descriptors: (*Leather, Chemical engineering), Atoms, Molecules, Symbols, Chemical reactions, Metals, Solutions, Ionization, Atomic structure, Hydrocarbons, Methane, Alcohols, Aldehydes, Ketones, Acids, Esters, Fatty acids, Waxes, Amines, Carbohydrates, Aromatic compounds, Halogen compounds, Dyes, Processing, Molecular structure.

Contents: Atoms and molecules; Symbols and formulas; Some non-metallic elements; Chemical reactions; Chemical arithmetic; Metals; Solutions; Ionization; Atomic structure; Introduction - structural theory; Hydrocarbons and methane series; Alcohols; Aldehydes, ketones, acids, esters; Fats, oils and waxes; Amines; Carbohydrates; Aromatic amines; Halogen compounds; and Dyes and dyeing.
PB-177 972 HC$3.00 MF$0.65

LEATHER CHEMISTRY FOR FOREMEN. SECOND YEAR COURSE,
Agency for International Development, Washington, D. C. Communications Resources Div.
Albert E. Chouinard. 1962, 121p Training Manual-120
Prepared in cooperation with Lowell Technological Institute, Mass., and Lawrence (A. C.) Leather Co., Peabody, Mass.

Descriptors: (*Leather, Chemical engineering), Hair, Skin, Proteins, Enzymes, Bacteria, Pickling, Quantitative analysis, Hydrolysis, pH, Oxidation-reduction reactions, Chromium, Tanning, Dyes, Coatings, Neutralization, Colloids.

Contents: Skin structure; Protein chemistry and soaking; Liming; Unhairing; Conditioning effects in liming; Enzymes, bacteria and bating; Bating; Pickling; Quantitative analysis; Hydrolysis equilibria; PH and oxidation reduction; Decreasing; Chromium - The werner co-ordination theory; Chrome complexes and olation; Chrome liquors; Two-bath process and neutralization; Chrome tanning theories - emulsions; Fatliquoring - stuffing and emulsions; Emulsion theories; Surface chemistry; Dyeing and coloring; Protective and decorative coatings.
PB-177 973 HC$3.00 MF$0.65

LEATHER CHEMISTRY FOR FOREMEN. THIRD YEAR COURSE,
Agency for International Development, Washington, D. C. Communications Resources Div.
Albert E. Chouinard. 1962, 53p Training Manual-121
Prepared in cooperation with Lawrence (A. C.) Leather Co., Peabody, Mass., and Lowell Technological Inst., Mass.

Descriptors: (*Leather, Chemical engineering), Instruction manuals, Solutions, Standards, Volumetric analysis, Chemical indicators, Chromates, Tanning, Histology, Histological techniques, Dyes, Colors, Finishes + finishing, Processing.

Contents: Weighing-- Measuring - standard solutions; Standard solutions; pH measurements and indicators; Volumetric analysis; Water analysis; Determination of hide substance; Determination of chromic oxide in leather; Analysis of leather; Analysis of vegetable tanning materials; Histology - the study of tissues, the microscope, the technique of slide making, special tests in leather microscopy; Beam house operations; Tanning; Retanning; Dyeing and fatliquoring; Formulation of three brown colors; Finishing.
PB-177 974 HC$3.00 MF$0.65

LEATHER TECHNOLOGY.
Agency for International Development, Washington, D. C. Communications Resources Div.
1962, 86p Training Manual-140

Descriptors: (*Leather, Processing), Instruction manuals, Tanning, Dyes, Lubrication, Skin, Curing agents, Colors, Costs.

Contents: Introduction; Hides and skins; Soaking and unhairing; Liming, beaming and splitting; Acids and alkalies and the pH system of measuring their strength; Tanning; Vegetable tanning; Leather lubrication; Drying and pasting; Dyes and coloring; Economics in the leather industry; Workshop on upper leather; Leather machinery terms.
PB-177 981 HC$3.00 MF$0.65

11H. Oils, Lubricants, and Hydraulic Fluids

METHOD OF APPRAISING THERMAL STABILITY OF FUELS UNDER DYNAMIC CONDITIONS (COLLECTION OF ARTICLES),
Foreign Technology Div Wright-Patterson AFB Ohio
For primary bibliographic entry see Field 21D.
AD-668 115 HC$3.00 MF$0.65

LUBRICATION AND BEARING PROBLEMS IN THE VACUUM OF SPACE.
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
For primary bibliographic entry see Field 13I.
For abstract, see STAR 06 10.
N68-19608 HC$3.00 MF$0.65

LUBRICANTS FOR INERTED LUBRICATION SYSTEMS IN ENGINES FOR ADVANCED AIRCRAFT.
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
For primary bibliographic entry see Field 1C.
For abstract, see STAR 06 10.
N68-20210 HC$3.00 MF$0.65

LUBRICATION FUNDAMENTALS AND PRACTICES. SESSIONS I, II, AND III.
International Cooperation Administration, Washington, D. C. Office of Industrial Resources.
Apr 57, 91p Technical Bull-43
Prepared in cooperation with Armstrong Cork Co., Lancaster, Pa. See also Session 4, 5, 6 and 7, PB-177 949.

Descriptors: (*Lubrication, Instruction manuals), Greases, Oils, Protection, Bearings, Viscosity, Friction, Specifications, Gears, Industrial equipment, Handling, Storage.

Contents: Principles of lubrication; Characteristics of lubricants; Methods of applying lubricants; Gears and their lubrication; General bearings, electric motors and their lubrication; Lubrication of plant equipment; and Lubrication department operation.
PB-177 948 HC$3.00 MF$0.65

LUBRICATION FUNDAMENTALS AND PRACTICES. SESSIONS IV, V, VI AND VII.
International Cooperation Administration, Washington, D. C. Office of Industrial Resources.
Apr 57, 137p Technical Bull-44
See also Sessions 1, 2, and 3, PB-177 948. Prepared in cooperation with Armstrong Cork Co., Lancaster, Pa.

Descriptors: (*Lubrication, Instruction manuals), Gears, Bearings, Electric motors, Friction, Industrial equipment, Lubricants, Handling, Storage.

Contents: Gears and their lubrication; Lubrication of general bearings and electric motors; Lubrication of plants equipment; Lubrication department operation.
PB-177 949 HC$3.00 MF$0.65

11I. Plastics

NEW IRON-CONTAINING MONOMERS AND POLYMERS FROM FIVE-MEMBERED NAPHTHENES,
Foreign Technology Div Wright-Patterson AFB Ohio
For primary bibliographic entry see Field 7C.
AD-668 062 HC$3.00 MF$0.65

INFLUENCE OF UV RADIATION AND VACUUM ON STRENGTH AND DESTRUCTION OF POLYMER FILMS,
Foreign Technology Div Wright-Patterson AFB Ohio
L. M. Polyakov. 18 Aug 67, 17p Rept no. FTD-MT-24-184-67
Edited machine trans. of Mekhanika Polimerov (Latvian SSR) n3 p359-64 1966.

Descriptors: (*Polyester plastics, Degradation), Ultraviolet radiation, Vacuum, Films, Polymers, Deformation, Cracks, Chemical bonds, Tensile properties, Plasticity, Stability, USSR.

The effect of UV radiation on the mechanical properties of poly (ethylene terephthalate) (PETP)

films was studied. The changes were noted in tensile strength and deformation, and the formation of defects, i.e., cracking. The samples used were strips of PETP film, 6 mm wide, 20 mm long and 10 microns thick. The irradiated samples were subjected to tensile strength tests on a special machine. It was found that open cracks developed on the irradiated side of the samples if the irradiation took place in air. Vacuum-irradiated samples developed cracks only on deformation during the tensile test. A weakening of molecular bonds during the irradiation was assumed. Cracking began at definite stresses and deformation which decreased with an increase in the radiation dose. The tensile strength and plasticity of the irradiated films decrease with an increase in the duration of irradiation. The air-irradiated samples display a higher loss in tensile strength than the vacuum-irradiated samples, which suffer a higher loss in plasticity. Vacuum-irradiated samples form no visible defects on the surface: their surface remains smooth even after rupture of the sample. (Author)
AD-668 098 HC$3.00 MF$0.65

CRYSTALLIZATION DURING POLYMERIZATION.
Rensselaer Polytechnic Inst Troy N Y Dept of Chemistry
For primary bibliographic entry see Field 7D.
AD-668 382 Not available from CFSTI.

BIOLOGICAL FOULING OF TRANSPARENT PLASTICS.
Naval Missile Center Point Mugu Calif
For primary bibliographic entry see Field 8A.
AD-668 491 HC$3.00 MF$0.65

PLANT REQUIREMENTS TO SET UP AND OPERATE A PLASTIC MOLDING PLANT.
Agency for International Development, Washington, D. C. Communications Resources Div.
For primary bibliographic entry see Field 13H.
PB-177 922 HC$3.00 MF$0.65

11K. Solvents, Cleaners, and Abrasives

STABILITY OF LYOPHOBIC COLLOIDS IN AQUEOUS MEDIA.
Technical rept.,
Army Weapons Command Rock Island Ill Research and Engineering Div
Charles J. Quilty, Mar 68, 29p
RIA-68-560

Descriptors: (*Cleaning compounds, Colloids), (*Colloids, Stability), Substrates, Weapons, Contamination, Electrophoresis, Electrical double layer, Surface-active substances.
Identifiers: *Weapons cleaners, Electrokinetic potential, Surface chemistry.

Detachment and stabilization of solid contamination from weapon substrates presents a difficult problem in weapons cleaning. An understanding of the fundamental principles involved in the stabilization of solid contamination is, therefore, important for formulation of improved weapons cleaning materials. In this investigation, the stability of common weapon contamination was studied in aqueous surfactant solutions. Zeta potentials of aqueous dispersions of lyophobic colloids were determined by electrophoresis measurements and compared with sedimentation times of the dispersed systems. The stability of the dispersions was found to be governed by double-layer electrostatic repulsion at the surface of the colloidal particles. Calculations based on the Derjaguin-Landau-Verwey-Overbeek theory of stability were in excellent agreement with the experimental data. (Author)
AD-667 971 HC$3.00 MF$0.65

11L. Wood and Paper Products

DYNAMIC PROPERTIES OF SMALL, CLEAR SPECIMENS OF STRUCTURAL-GRADE TIMBER.
Technical rept. 1 Jul 65-30 Jun 67,
Naval Civil Engineering Lab Port Hueneme Calif
John R. Keeton, Apr 68, 64p Rept no. NCEL-TR-573

Descriptors: (*Wood, Mechanical properties), Bending, Modulus of elasticity, Shear stresses, Compressive properties, Loading (Mechanics), Impact shock, Flexural strength, Trees, Drying, Structural properties, Thickness, Standards, Classification, Tables, Rupture, Test methods, Specifications.
Identifiers: Green lumber, Timber, *Douglas Fir.

About 300 static and 1,100 dynamic tests were made on small, clear specimens of Douglas fir (coast type). Green specimens and dry specimens were tested in shear parallel to the grain, bending, compression parallel to the grain, and compression perpendicular to the grain. Green specimens showed increases in dynamic strength values over static strength values, with the exception of modulus of elasticity in bending. Dry specimens showed increases in dynamic strengths over static strengths in shear, compression parallel to the grain, and compression perpendicular to the grain. In bending, the strength of dry specimens was drastically reduced at the higher rates of dynamic loading. In bending tests on green specimens, the modulus of rupture at speeds (or strain rates) corresponding to impact and blast loading was a maximum of 54% greater than the MOR at static speeds. On the basis of these results, it was concluded that conventional increased strength allowances for impact loading are excessive by as much as 46%. (Author)
AD-668 487 HC$3.00 MF$0.65

PAPERMAKING AND MANUFACTURE OF PAPER PRODUCTS AS A SMALL-SCALE, SEMI-MECHANIZED AND COTTAGE INDUSTRY. MATERIALS--PROCESSES--EQUIPMENT ORGANIZATION--ECONOMICS--MARKETING,
International Cooperation Administration, Washington, D. C.
J. Ben Lieberman, Jun 58, 291p
Prepared in cooperation with Stanford Research Inst., Menlo Park, Calif.

Descriptors: (*Paper industry, *Economics), Paper, Manufacturing methods, Feasibility studies, Site selection, Industrial training, Natural resources, Organic materials, Materials, Agriculture, Test methods, Analysis, Sociology, China, Japan.

This Manual is designed to provide a general picture of the factors which must be considered in establishing and operating a small-scale papermaking industry. It should prove useful in creating interest in the subject, and serve to give enough understanding of the related considerations to help government officials, other leaders and entrepreneurs determine whether the potential deserves more-detailed attention. Also, special segments of the Manual may serve as separate manuals or references for specific phases of the subject.
PB-177 916 HC$3.00 MF$0.65

PLANT REQUIREMENTS FOR MANUFACTURE OF WOOD TABLES AND CHAIRS.
International Cooperation Administration, Washington, D. C. Technical Aids Branch.
For primary bibliographic entry see Field 13H.
PB-177 925 HC$3.00 MF$0.65

PLANT REQUIREMENTS FOR MANUFACTURE OF PLYWOOD.
International Cooperation Administration, Washington, D. C. Technical Aids Branch.
For primary bibliographic entry see Field 13H.
PB-177 930 HC$3.00 MF$0.65

PLANT REQUIREMENTS FOR MANUFACTURE OF WALLBOARD FROM GYPSUM AND FIBER.
Agency for International Development, Washington, D. C. Communications Resources Div.
For primary bibliographic entry see Field 13H.
PB-177 940 HC$3.00 MF$0.65

A SMALL PARTICLE BOARD PLANT.
International Cooperation Administration, Washington, D. C. Office of Industrial Resources.
For primary bibliographic entry see Field 13H.
PB-177 944 HC$3.00 MF$0.65

12. MATHEMATICAL SCIENCES

12A. Mathematics and Statistics

REPRESENTATION AND ANALYSIS OF SIGNALS. PART XIII. DISCRETE ORTHONORMAL EXPONENTIALS,
Johns Hopkins Univ., Baltimore, Md.
For primary bibliographic entry see Field 9D.
AD-411 370 HC$3.00

A NOTE ON THE ASYMPTOTIC EFFICIENCY OF FRIEDMAN'S CHI-SQUARED SUB R-TEST,
North Carolina Univ Chapel Hill
Pranab Kumar Sen, 1967, 5p
AROD-2776:35
Grant DA-ARO (D)-31-124-G746
Prepared in cooperation with Calcutta Univ. (India).
Availability: Published in Biometrika, v54 n3/4 p677-9 1967.

Descriptors: (*Statistical tests, Inequalities), Distribution functions, Probability density functions, Analysis of variance, Combinatorial analysis.
Identifiers: *Asymptotic efficiency, Friedman's test, Heteroscedastic error components.

The robustness-efficiency of Friedman's (1937) chi-squared sub r-test for heteroscedastic error components is established here. Further, when the error components are homoscedastic but not identically distributed, some bounds for the asymptotic efficiency of chi-squared sub r-test are derived. (Author)
AD-667 891 Not available from CFSTI.

PAIRED COMPARISONS FOR PAIRED CHARACTERISTICS.
Revised ed.,
North Carolina Univ Chapel Hill
P. K. Sen, and H. A. David, 15 Jul 67, 12p
AROD-2776:44
Grant DA-ARO (D)-31-124-G746
Revision of Report dated, 19 Sep 66.
Availability: Published in The Annals of Mathematical Statistics, v39 n1 p200-8 1968.

Descriptors: (*Statistical analysis, Theorems), Analysis of variance, *Statistical distributions, *Combinatorial analysis, *Statistical tests, Correlation techniques, Random variables.
Identifiers: Likelihood functions, Likelihood ratio tests.

The present investigation is concerned with the proposal and study of a class of nonparametric paired comparison tests for the hypothesis of no differences among several objects with respect to a pair of characteristics. (Author)
AD-667 892 Not available from CFSTI.

THE VALUE OF PRIOR INFORMATION.
Technical rept.,
Wisconsin Univ Madison Dept of Statistics
Norman R. Draper, and Irwin Guttman, Dec 67, 31p Rept no. TR-135
Contract DA-31-124-ARO (D)-462

Descriptors: (*Statistical distributions, Sampling), Distribution functions, Binomials, Determinants, Matrix algebra, Distribution theory.

Sample y1,y2....,yn of observations from some specified parent distribution, together with some prior information on one or more parameters of interest of the distribution. Then by applying Bayes theorem we can obtain the overall distribution (or the marginal distribution) if nuisance parameters are involved of parameters of interest, and can make inferences about these parameters. A natural question to ask is how inferences might be affected by a change in the prior distribution, i.e. by the availability of more, or less, information on the parameters. It would be convenient to have a quantity which could be used to indicate the value of more or less prior information. It is suggested, in this paper, for the one parameter case, the use of the ratio the expected values of the posterior variance of the parameter, expectation being taken over the future distribution of the sampling statistics which occur in the posterior variance. We illustrate the use of this ratio for a number of well-known distributions. (Author)
AD-667 926 HC$3.00 MF$0.65

NEW CORRELATION BETWEEN A HUMAN SUBJECT AND A QUANTUM MECHANICAL RANDOM NUMBER GENERATOR,
Boeing Scientific Research Labs Seattle Wash Plasma Physics Lab
For primary bibliographic entry see Field 5J.
AD-667 953 HC$3.00 MF$0.65

ONE-LINE RANDOM NUMBER GENERATORS AND THEIR USE IN COMBINATIONS,
Boeing Scientific Research Labs Seattle Wash Mathematics Research Lab
George Marsaglia, and T. A. Bray. Mar 68, 12p
Rept nos. D1-82-0689, Mathematical note-551

Descriptors: (*Random variables, Programming (Computers)), Digital computers, Numbers, Subroutines.
Identifiers: FORTRAN, Random number generators, IBM 360, IBM 7094, SRU 1108 computer.

This is a discussion of some one-line random number generators, requiring a single FORTRAN instruction, together with a description of some short FORTRAN programs which mix several such generators. Evidence suggesting that the simple congruential generators are unsatisfactory continues to grow; one of the most promising alternatives is to mix several simple generators. These composite generators do better in various tests for randomness than do the simple congruential generators used at many computer centers.
AD-667 956 HC$3.00 MF$0.65

RISK AVERSION IN STOCHASTIC PROGRAMMING WITH RECOURSE.
Research rept.,
Carnegie-Mellon Univ Pittsburgh Pa Management Sciences Research Group
David Rutenberg. Feb 68, 22p Rept no. RR-122
Contract Nonr-760 (24)
See also Research Report no. 111, AD-657 431.

Descriptors: (*Mathematical programming, *Stochastic processes), Game theory, Probability, Curve fitting, Iterations, Linear programming, Nonlinear systems, Vector analysis, Equations, Matrix algebra, Uncertainty, Minimax technique, Algorithms, Decision making, Management planning.
Identifiers: Concave utility functions, Recourse (Iterative methods), Risk aversion.

In stochastic programming with recourse the objective is to maximize expected net payoff. This implicitly assumes no aversion to risk. This paper introduces risk aversion into stochastic programming with recourse. The objective becomes to maximize the expected (concave) utility of the net payoffs. Because of the special structure of the problem a number of computational short cuts are possible in the mathematical program that results. The latest representation of the gradient is but a slight modification of the latest representation of the linear objective function without risk aversion. All the second stage problems can be solved as linear programs. Unfortunately it appears necessary to solve the first stage problem as a non-linear program. (Author)
AD-667 968 HC$3.00 MF$0.65

A NEW PETROLEUM AND NATURAL GAS SUBMODEL OF THE PARM PROTOTYPE MODEL.
National Resource Analysis Center Washington D C
For primary bibliographic entry see Field 21D.
AD-667 984 HC$3.00 MF$0.65

RADIO INTERFERENCE PREDICTION BY THE STATISTICAL TERRAIN METHOD.
C-E-I-R Inc Arlington Va
For primary bibliographic entry see Field 17B.
AD-667 987 HC$3.00 MF$0.65

FUNDAMENTAL THEOREMS ON THE EXTENSION OF HERMITIAN OPERATORS AND SOME OF THEIR APPLICATIONS TO THE THEORY OF ORTHOGONAL POLYNOMIALS AND TO THE PROBLEM OF MOMENTS,
Johns Hopkins Univ Silver Spring Md Applied Physics Lab
M. G. Krein, and M. A. Krasnoselskii. 14 Feb 68, 78p Rept no. APL-TG-230-T536
Contract NOw-62-0604
Trans. of Uspekhi Matematicheskikh Nauk (USSR) v2 n3 (19) p60-106 1947, tr. by N. Rubinstein.

Descriptors: (*Operators (Mathematics), Theorems), Polynomials, Sequences, Transformations (Mathematics), Hilbert space, Functional analysis, USSR.
Identifiers: Translations, Hermitian operators, Ergodic theory.

Presented are various theorems on the extension of operators with a systematic use of a linear-fractional transformation of a linear operator. Also shown is that every Hermitian operator with dense domain of definition which has a spectral gap admits a self-adjoint extension and preserves the gap. The invariance of defect indices in the upper and lower half planes is proven for the case of arbitrary linear operators. Fundamental concepts dealing with linear operators in a Hilbert space are presented. Various examples appear throughout the paper showing the application of the derived theorems. They are taken from the theory of orthogonal polynomials and the problem of moments. (Author)
AD-668 000 HC$3.00 MF$0.65

ESTIMATING ITEM CHARACTERISTIC CURVES WITHOUT KNOWLEDGE OF THEIR MATHEMATICAL FORM,
Educational Testing Service Princeton N J
For primary bibliographic entry see Field 5J.
AD-668 024 HC$3.00 MF$0.65

ON SUBALGEBRAS WHICH SURVIVE CONTRACTION,
California Univ Berkeley Dept of Physics
For primary bibliographic entry see Field 20J.
AD-668 042 Not available from CFSTI.

TWO-WAY BALLOON AUTOMATA AND AFL,
System Development Corp Santa Monica Calif
For primary bibliographic entry see Field 5G.
AD-668 088 HC$3.00 MF$0.65

BOUNDS FOR EIGENVALUES OF AN INTEGRAL OPERATOR.
Technical rept.,
Johns Hopkins Univ Silver Spring Md Applied Physics Lab
J. T. Stadter. Feb 68, 17p Rept no. APL-TG-979
Contract NOw-62-0604

Descriptors: (*Operators (Mathematics), Integrals), Fourier analysis, Vector spaces, Functions, Series.
Identifiers: Integral operators, Intermediate problems, Rayleigh-Ritz procedure, Eigenvalues, Computer analysis.

The report illustrates the application of the method of intermediate problems for estimating the eigenvalues of integral operators. The method yields upper bounds to the positive eigenvalues of integral operators; lower bounds are obtained using the Rayleigh-Ritz procedure. Close bounds are given for eigenvalues of the operator with symmetric kernel K (x,y) = summation from i,j = 1 to i,j = infinity, of the quantity (sin ix sin jy/ (i to the 4th power + j to the 4th power)). (Author)
AD-668 143 HC$3.00 MF$0.65

TESTING FOR EQUALITY OF MEANS, EQUALITY OF VARIANCES AND EQUALITY OF COVARIANCES UNDER RESTRICTIONS UPON THE PARAMETER SPACE (PRELIMINARY REPORT).
Technical rept.,
Johns Hopkins Univ Baltimore Md Dept of Statistics
Leon Jay Gleser, and Ingram Olkin. Jul 67, 27p
Rept no. TR-76
Contract Nonr-4010 (09)
Prepared in cooperation with Stanford Univ., Calif. Dept. of Statistics, Grant NSF-G6681.

Descriptors: (*Statistical analysis, Problem solving), (*Psychometrics, Statistical tests), Analysis of variance, Multivariate analysis, Statistical distributions, Transcendental functions, Matrix algebra, Inequalities, Vector spaces, Convergence, Theorems.
Identifiers: Covariance matrix, Multivariate normal distribution, Likelihood ratio tests, Maximum likelihood, Hypothesis testing, Asymptotic distribution.

Suppose that the p-dimensional random row vector x has a multivariate normal distribution with mean mu and covariance matrix Sigma. Wilks (Ann. Math. Statist. 17 (1946)) has derived likelihood-ratio tests of the hypothesis H sub mvc and H sub vc against general alternatives H. Here H sub mvc is the hypothesis that the components of the mean vector mu are equal (mu = eta (1, 1, ..., 1) is identical with eta e, where eta is an unknown constant) and that Sigma has the intraclass correlational form Sigma = sigma squared ((1-rho)I + rho e e prime). H sub vc is the hypothesis that Sigma has the intraclass correlational form, mu unrestricted; H is the hypothesis that mu is unrestricted and Sigma is unrestricted, positive definite. In the present paper, we consider likelihood ratio tests of the hypotheses Hr sub mvc and Hr sub vc against general alternatives H, where Hr sub mvc and Hr sub vc differ from H sub mvc and H sub vc, respectively, by constricting the common correlation to lie in an interval rho sub 0 = or < rho < 1. Such tests have practical importance in psychological testing theory, in the analysis of growth curves, and in other contexts.
AD-668 147 HC$3.00 MF$0.65

THE POWER OF SOME TESTS FOR UNIFORMITY OF A CIRCULAR DISTRIBUTION.
Technical rept.,
Johns Hopkins Univ Baltimore Md Dept of Statistics
R. J. W. Beran. Jan 68, 39p Rept no. TR-78
Contract Nonr-4010 (09)

Descriptors: (*Statistical distributions, Test methods), Random variables, Fourier analysis, Transcendental functions, Series, Sampling, Mapping (Transformations), Probability density functions, ntegral transforms, Distribution functions, Statistical tests, Convergence, Theorems.
Identifiers: *Circular distributions, Asymptotic null distribution, Eigenvalues.

Let (x sub 1, x sub 2,...,x sub n) be independent observations on an arbitrary random variable which takes values on a circle of unit circumference. Suppose f (x) is a probability density in L sub 2 (0,1). The main result of this paper is the asymptotic distribution of the class of test statistics T sub n = (1/n) multiplied by the integral taken between the limits 0,1 of the quantity (summation from j = 1 to j = n of f (x + x sub j)-n) squared dx. T sub n is used to test whether the observations are uniformly distributed on the circle. It includes as special cases several other statistics previously proposed for this purpose by Rayleigh, Watson, Ajne and others. Two distinct cases arise in the asymptotics -- for one class of alternatives T sub n yields a consistent test for uniformity, but for the others T sub n gives a test which is not consistent. A fair approximation to the power of T sub n can be obtained from its first two moments. The approximate Bahadur slope of T sub n is calculated from its asymptotic null distribution it does not appear to reflect the power of T sub n reliably. (Author)
AD-668 150 HC$3.00 MF$0.65

ON TESTING A SET OF CORRELATION COEFFICIENTS FOR EQUALITY. I. SOME ASYMPTOTIC RESULTS.
Technical rept.,
Johns Hopkins Univ Baltimore Md Dept of Statistics
Leon Jay Gleser. Nov 67, 15p Rept no. TR-80
Contract Nonr-4010 (09)

Descriptors: (*Statistical analysis, Theorems), Matrix algebra, Statistical tests, Statistical distributions, Correlation techniques, Sampling, Analysis of variance, Functions.
Identifiers: Covariance matrix, Asymptotic null distribution.

Consider a random p-dimensional vector x having a multivariate normal distribution. We are interested in testing the hypothesis H that the correlations rho sub ij between the elements of x are equal to a common value rho (i not = j). The likelihood ratio test of H versus general alternatives is difficult to evaluate and complicated in form. Alternative tests have been proposed by Bartlett (J.R.S.S. Ser. B 16 296-298) by Lawley (Ann. Math. Statist. 34 149-151), and by Aitkin and Nelson (unpublished). The asymptotic null distributions of Bartlett's and Lawley's tests have been obtained by Anderson (Ann. Math. Statist. 34 122-148) and Lawley (loc. cit.). The asymptotic null distribution of the Aitkin-Nelson test has not yet been obtained. The present paper obtains the asymptotic null distribution of the previously mentioned tests in a unified general fashion. Each of the above three tests is shown to be (under H) asymptotically equivalent to a member of a certain class of quadratic forms involving the sample correlations r sub ij. The asymptotic null distributions of such quadratic forms are obtained using the method of Lawley (loc. cit.). The null distribution of the Aitkin-Nelson test is found to be dependent upon rho (the parameter unspecified in the null hypothesis) in such a fashion as to suggest that the Aitkin-Nelson test is unpractical for most applications. (Author)
AD-668 151 HC$3.00 MF$0.65

ON SOME RESULTS CONCERNING STOPPING RULES.
Technical rept.,
Johns Hopkins Univ Baltimore Md Dept of Statistics
Leon J. Gleser, and S. Zacks. Feb 68, 22p Rept no. TR-83
Contract Nonr-4010 (09)
Prepared in cooperation with Kansas State Univ., Manhattan under grant NSF-GP-7402.

Descriptors: (*Statistical distributions, Confidence limits), Analysis of variance, Decision theory, Sampling, Random variables, Sequences, Convergence, Theorems.
Identifiers: *Stopping rules, Asymptotic solutions.

As a part of the investigation of sequential fixed-width confidence interval procedures for estimating the common mean of two distributions having unequal variances, it was found necessary to extend some of the results of Chow and Robbins (Ann. Math. Statist. 36 (1965) 457-462) to cover somewhat more general kinds of stopping rules. For example, although Chow and Robbins treat only one-sided stopping boundaries, the present investigation requires one to consider two-sided (or even many-sided) stopping boundaries. Further, some of the boundaries of interest have a slightly more general functional form than do the stopping boundaries discussed in the Chow-Robbins paper. The results given in the present paper provide first-order asymptotic results for the distribution and expected value of the various stopping variables N (the random number of observations taken) considered, the form of the results being similar to those announced in the Chow-Robbins paper referred to above. (Author)
AD-668 152 HC$3.00 MF$0.65

ON LIMITING DISTRIBUTIONS FOR SUMS OF A RANDOM NUMBER OF INDEPENDENT RANDOM VARIABLES.
Technical rept., 9
Johns Hopkins Univ Baltimore Md Dept of Statistics
Leon Jay Gleser. Feb 68, 19p Rept no. TR-86
Contract Nonr-4010 (09)

Descriptors: (*Statistical distributions, Theorems), Distribution functions, Matrix algebra, Set theory, Numerical methods and procedures, Random variables, Sequences.
Identifiers: Limiting distributions.

The main result of the paper is a generalization of a theorem by Mogyorodi (Publ. Math. Inst. Hungar. Acad. Sci. 6, 365-371). This generalization of Mogyorodi's theorem is applied to give simpler proofs, under less restrictive conditions, of some recent results of A. Albert (Ann. Math. Statist. 37, 1602-1630) and M. S. Srivastava (unpublished) connected with the asymptotic distribution of a sequential estimator for the regression coefficients in ANOVA and MANOVA.
AD-668 153 HC$3.00 MF$0.65

DENSITY ESTIMATION BY ORTHOGONAL SERIES.
Technical rept.,
Johns Hopkins Univ Baltimore Md Dept of Statistics
Geoffrey S. Watson. Apr 68, 7p Rept no. TR-90
Contract Nonr-4010 (09)

Descriptors: (*Probability density functions, Series), Sampling, Functions, Statistical distributions.

Given a random sample x sub 1,...,x sub n from the density f (x) = Summation of (alpha sub m phi sub m (x)) where (braces) phi sub m (x) is an orthogonal basis, the estimator f star sub n(x) = Summation from zero to infinity of (lambda sub m(n)a sub m phi sub m (x)) where a sub m = (1/n) Summation from k = 1 to k = n, of phi sub m (x sub k) is suggested. f star sub n (x) will be a minimum integrated mean square error estimator in its class. These estimators are related to the kernel estimators discussed by Watson and Leadbetter (Ann. Math. Statist. 1963.34.480-491.).
AD-668 155 HC$3.00 MF$0.65

HYPERBOLIC MEAN AUTOMORPHIC FUNCTIONS.
Illinois Univ Urbana Dept of Mathematics
Lee A. Rubel, and A. L. Shields. 3 Apr 68, 8p
AFOSR-68-0789
Grant AF-AFOSR-460-63
Prepared in cooperation with Institute for Advanced Study, Princeton, N. J.
Availability: Published in Inventiones Mathematicae, v4 p294-8 1967.

Descriptors: (*Functional analysis, Theorems), Mapping (Transformations), Operators (Mathematics), Vector spaces, Complex numbers, Set theory, Functions, Measure theory.

The following result is proved THEOREM: If f epsilon C (R superscript n) and f does not have the form f (x sub 1,.... x sub n) = f sub 1 (x prime sub 1) + ... + f sub n (x prime sub n), where f sub j (x prime sub j) denotes a function that does not depend on x sub j, then the span of the hyperbolic motions of f is dense in C (R superscript n) in the topology of uniform convergence on compact sets. Here, a hyperbolic motion of f is a function f sub phi (x) = f (phi (x)), where phi (x) = (phi sub 1 (x sub 1), ... phi sub n (x sub n)), where each phi sub j is a homeomorphism of R superscript 1 onto R superscript 1. (Author)
AD-668 214 Not available from CFSTI.

SURFACE RESPONSE OF AN ELASTIC MEDIUM TO NORMAL PRESSURES APPLIED OVER CONSTANT AND EXPANDING CIRCULAR AREA.
Weidlinger (Paul) New York
For primary bibliographic entry see Field 18C.
AD-668 256 HC$3.00 MF$0.65

STABILITY THEORY FOR ORDINARY DIFFERENTIAL EQUATIONS.
Brown Univ Providence R I Center for Dynamical Systems
J. P. LaSalle. Apr 68, 11p
AFOSR-68-0767
Contract DA-31-124-ARO (D)-270, Grant AF-AFOSR-693-67
Research supported in part by NA/SA grant NGR-40-002-015
Availability: Published in Journal of Differential Equations, v4 n1 p57-65 1968.

Descriptors: (*Differential equations, Stability), Set theory, Invariance, Theorems.
Identifiers: Lyapunov functions, Asymptotic behavior, Asymptotic stability, Stability theory.

The stability theory presented was developed in a series of previous papers. The purpose of this paper is to refine the fundamental theorems and to provide proofs for results which previously had only been stated. The applications of this theory have been discussed and illustrated in the previous papers. Results are given for locating limit sets of nonautonomous systems. This result is an improvement of a theorem given by Yoshizawa. Section 3 is for autonomous ordinary differential equations, and from Theorems 2 and 3 follow all of the classical Liapunov results on the stability and instability of these systems. (Author)
AD-668 283 Not available from CFSTI.

AN INVESTIGATION OF THE ANALYTIC PROPERTIES OF SOLUTIONS TO THE GENERALIZED AXIALLY SYMMETRIC, REDUCED WAVE EQUATION IN n + 1 VARIABLES, WITH AN APPLICATION TO THE THEORY OF POTENTIAL SCATTERING.
Revised ed.,
Indiana Univ Bloomington Dept of Mathematics
Robert P. Gilbert. 10 May 67, 53p
AFOSR-68-0766
Grants AF-AFOSR-1206-67, NSF-GP-5023
Revision of report dated 13 Jul 66.
Availability: Published in SIAM J. Appl. Math., v16 n1 p30-50 1968.

Descriptors: (*Partial differential equations, Problem solving), Potential theory, Operators (Mathematics), Mapping (Transformations), Complex variables, Bessel functions, Boundary value problems, Series, Convergence, Quantum mechanics, Theorems.

Identifiers: Wave equation, Potential scattering, Schrodinger equation.

The analytic properties of solutions to the following differential equation is investigated: L (subscript lambda s, superscript n) Psi (in brackets) is identically equal to the second partial derivative of Psi with respect to x sub 1 + ... + the second partial derivative of Psi with respect to x sub n + the second partial derivative of Psi with respect to rho + (s/rho) the partial derivative of Psi with respect to rho + lambda squared Psi = 0, where s >-1 and lambda not equal to zero is real. An integral operator is found which maps the family of holomorphic functions in n-complex variables onto solutions of this equation. An inverse operator is also found. Theorems concerning the location of singularities and growth of solutions are proved. Application to a generalized scattering problem are given which show how integral operators may be used to describe the dynamic singularities and the bound states which occur in scattering theory. (Author)
AD-668 285 Not available from CFSTI.

ON THE LEFT-HANDED, RIGHT-HANDED AND TWO-SIDED PRIMES.
Interim rept.,
Florida Univ Gainesville Dept of Mathematics
L. M. Chawla, J. E. Maxfield, and Amin Muwafi.
Apr 68, 7p
AFOSR-68-0769
Grant AF-AFOSR-472-65
Availability: Published in Journal of Natural Sciences and Mathematics, v7 n1 p95-9 Apr 67.

Descriptors: (*Prime numbers, Theorems), Number theory, Tables.
Identifiers: Computer analysis.

The paper concerns a classification of prime numbers into left-handed, right-handed and two-sided prime numbers. It is conjectured that the number of right-handed primes is infinite. The paper gives a list of left-hand primes, a list of right-handed primes up to 12953, and a list of two sided primes. (Author)
AD-668 310 Not available from CFSTI.

DERIVATION PAIRS ON THE HOLOMORPHIC FUNCTIONS.
Illinois Univ Urbana
Lee A. Rubel. 3 Apr 68, 8p
AFOSR-68-0788
Grant AF-AFOSR-460-63
Availability: Published in Funkcialaj Ekvacioj v10 n3 p225-7 Dec 1967.

Descriptors: (*Functional analysis, Algebraic topology), Complex variables, Functions, Convergence.

Let H (G) be the algebra of holomorphic functions on a region G in the complex plane, under the topology of uniform convergence on compact subsets of G. The term 'derivation pair' is used to denote two continuous linear functionals on this algebra that satisfy, for all pairs, f, g of elements of H (G) the relation L (fg) = L (f)M (g) + M (f)L (g). All derivation pairs on H (G) are found. (Author)
AD-668 311 Not available from CFSTI.

A COMPUTER PROGRAM FOR THE NUMERICAL SOLUTION OF HYPERBOLIC PARTIAL DIFFERENTIAL EQUATIONS BY THE METHOD OF CHARACTERISTICS.
Naval Ordnance Lab White Oak Md
Jonathan Lee, Ralph Ferguson, and Theodore Orlow. 31 Jan 68, 35p Rept no. NOLTR-68-7

Descriptors: (*Partial differential equations, Numerical analysis), (*Programming (Computers), Partial differential equations), Hypersonic flow, Supersonic flow, Matrix algebra, Simultaneous equations, Computer programs.
Identifiers: FORTRAN, Method of characteristics, Quasilinear partial differential equations, IBM 7090.

A computer program is presented for solving a system of two quasilinear partial hyperbolic differential equations in two independent and two dependent variables by the method of characteristics. There is a discussion of the characteristic equations and the compatibility relations. The second order finite difference approximations to these are given along with a method to solve the difference equations. (Author)
AD-668 324 HC$3.00 MF$0.65

SPECTRAL METHODS IN ECONOMETRICS.
Rand Corp Santa Monica Calif
For primary bibliographic entry see Field 5C.
AD-668 364 Not available from CFSTI.

ON COMPUTING BEST SPLINE APPROXIMATIONS.
Technical summary rept.,
Wisconsin Univ Madison Mathematics Research Center
Larry L. Schumaker. Jan 68, 17p Rept no. MRC-TSR-833
Contract DA-31-124-ARO (D)-462

Descriptors: (*Approximation (Mathematics), Algorithms), Determinants, Set theory, Numerical methods and procedures, Polynomials, Functions, Computer programs, Theorems.
Identifiers: ALGOL programming language, Spline functions, Spline approximations.

An exchange algorithm for uniform spline approximation with prescribed knots is developed. Implementation and numerical experience are discussed, and an Algol program is appended. (Author)
AD-668 391 HC$3.00 MF$0.65

A CONVOLUTION STRUCTURE FOR JACOBI SERIES.
Technical summary rept.,
Wisconsin Univ Madison Mathematics Research Center
Richard Askey, and Stephen Wainger. Dec 67, 37p Rept no. MRC-TSR-820
Contract DA-31-124-ARO (D)-462

Descriptors: (*Approximation (Mathematics), Polynomials), (*Algebras, Approximation (Mathematics)), Inequalities, Operators (Mathematics), Series, Convergence, Transcendental functions, Fourier analysis, Integrals, Theorems.
Identifiers: Convolution, Asymptotic expansions.

The purpose of this paper is to show that there is a natural Banach algebra structure associated with expansions in Jacobi polynomials. (Author)
AD-668 392 HC$3.00 MF$0.65

NONLINEAR EQUATIONS ARISING IN DEFERRED CORRECTION OF INITIAL VALUE PROBLEMS.
Technical summary rept.,
Wisconsin Univ Madison Mathematics Research Center
James W. Daniel. 1968, 14p Rept no. MRC-TSR-818
Contract DA-31-124-ARO (D)-462

Descriptors: (*Initial value problems, Numerical methods and procedures), Vector spaces, Approximation (Mathematics), Mapping (Transformations), Differential equations, Operators (Mathematics), Nonlinear systems, Iterative methods, Theorems.
Identifiers: Multistep methods, Stability theorem.

Nonlinear equations arising in the deferred correction method for initial value problems are related to advanced multi-step methods. Such methods are shown to be stable in the usual norm if the usual condition of stability for the approximation to the highest order differential term is satisfied. (Author)
AD-668 393 HC$3.00 MF$0.65

SEQUENTIAL MONTE CARLO (REVISED).
Technical summary rept.,
Wisconsin Univ Madison Mathematics Research Center
John H. Halton. Dec 67, 40p Rept no. MRC-TSR-816
Contract DA-31-124-ARO (D)-462

Descriptors: (*Sequential analysis, Monte Carlo method), (*Monte Carlo method, Sampling), Equations, Matrix algebra, Integrals, Series, Convergence, Sequences, Linear systems, Probability, Statistical distributions, Theorems.
Identifiers: Probability distributions, Eigenvalues.

The paper explores the possibilities of constructing Monte Carlo sampling schemes incorporating sequential improvement of the estimator used. Three such schemes are suggested for the solution of problems reducible to linear systems of equations. Computational experience suggests that the methods are workable in practice (though sometimes requiring simplification to avoid excessive labor.) The present text is an extensive revision of a paper with the same title published in Proc. Camb. Phil. Soc. 58 (1962) 57-78. (Author)
AD-668 394 HC$3.00 MF$0.65

ON APPROXIMATION BY POLYNOMIALS HAVING RESTRICTED RANGES.
Technical summary rept.,
Wisconsin Univ Madison Mathematics Research Center
L. L. Schumaker, and G. D. Taylor. Jan 68, 15p Rept no. MRC-TSR-835
Contract DA-31-124-ARO (D)-462

Descriptors: (*Approximation (Mathematics), Polynomials), Set theory, Algorithms, Interpolation, Convergence, Sequences, Banach space, Theorems.
Identifiers: Existence theorems, Uniqueness theorem.

Existence and uniqueness of a best approximation by polynomials whose range is restricted to lie between lower and upper functions is obtained. In addition a computational algorithm for obtaining the best approximation is discussed. (Author)
AD-668 395 HC$3.00 MF$0.65

AUTOMATIC GENERATION OF TAYLOR COEFFICIENTS (TAYLOR), FOR THE CDC 1604.
Technical summary rept.,
Wisconsin Univ Madison Mathematics Research Center
Allen Reiter. Nov 67, 98p Rept no. MRC-TSR-830
Contract DA-31-124-ARO (D)-462

Descriptors: (*Numerical methods and procedures, Power series), (*Programming (Computers), Numerical methods and procedures), Differential equations, Approximation (Mathematics), Analytic functions, Matrix algebra, Feasibility studies, Flow charting, Computer programs.
Identifiers: CDC 1604 computer, FORTRAN.

The report describes a CDC 1604 program designed to provide automatic means for a power-series expansion with respect to some real variable of a system of analytic functions of n real variables. The program can be used, for example, as a basis for the solution of systems of ordinary differential equations by successive expansions in power series. (Author)
AD-668 397 HC$3.00 MF$0.65

SINGULARITIES DUE TO RE-ENTRANT CORNERS IN HARMONIC BOUNDARY VALUE PROBLEMS.
Technical summary rept.,
Wisconsin Univ Madison Mathematics Research Center
J. R. Whiteman. Dec 67, 57p Rept no. MRC-TSR-829
Contract DA-31-124-ARO (D)-462

Descriptors: (*Partial differential equations, Numerical methods and procedures), Boundary value problems, Potential theory, Series, Convergence, Interpolation, Iterative methods, Transcendental functions, Approximation (Mathematics), Transformations (Mathematics), Matrix algebra.
Identifiers: Dirichlet problem, Truncation error, Duel series method, Eigenvalues, Computer analysis.

Numerical methods are presented for the solution of harmonic boundary value problems containing re-entrant corners. The methods are applied to a model problem containing a slit. (Author)
AD-668 399 HC$3.00 MF$0.65

NUMERICAL SOLUTION OF ORDINARY DIFFERENTIAL EQUATIONS BY SPLINE FUNCTIONS (SPLINDIF).
Technical summary rept.,
Wisconsin Univ Madison Mathematics Research Center
Frank R. Loscalzo. Jan 68, 40p Rept no. MRC-TSR-842
Contract DA-31-124-ARO (D)-462

Descriptors: (*Differential equations, Numerical analysis), (*Programming (Computers), Differential equations), Initial value problems, Approximation (Mathematics), Interpolation, Polynomials, Iterations, Taylor's series, Nonlinear differential equations, Errors, Subroutines.
Identifiers: Spline functions, FORTRAN, CDC 1604 computer.

A computer subroutine package, SPLINDIF, which implements a new method for obtaining global approximations to solutions of systems of nonlinear first order differential equations with given initial values is described. The numerical solutions are spline functions of degree 2q with q continuous derivatives. The method is a one-step predictor-corrector scheme based on Hermite's quadrature formula of 1878. The package consists of subroutines written in FORTRAN-63 for the CDC 1604 computer. This package uses TAYLOR, which is written in FORTRAN-63 and CODAP Assembly Language. (Author)
AD-668 400 HC$3.00 MF$0.65

GEOGRAPHY AND THE PROPERTIES OF SURFACES. N-DIMENSIONAL SPATIAL ANALYSIS AND COMPUTER GRAPHICS. PART A.
Paper no. 16, Harvard Papers in Theoretical Geography,
Harvard Univ Cambridge Mass Lab for Computer Graphics
C. Ernesto, and S. Lindgren. 24 Apr 68, 60p
Rept no. TR-16
Contract N00014-67-A-0298

Descriptors: (*Graphics, Computers), Surfaces, Geometry, Geodesics, State-of-the-art reviews.
Identifiers: Computer aided graphics, Descriptive geometry, Spatial analysis, Graphs (Charts).

The paper, the first of a series with the same title, discusses the state of the art in n-dimensional methods of spatial analysis and selects one of such methods, developed within the last 10 years, proposing its application by means of computer graphics techniques. (Author)
AD-668 405 HC$3.00 MF$0.65

SUBGRAPHS OF BIPARTITE AND DIRECTED GRAPHS,
Rand Corp Santa Monica Calif
Jon Folkman, and D. R. Fulkerson. Apr 68, 27p
Rept no. RM-5604-PR
Contract F44620-67-C-0045

Descriptors: (*Graphics, Theorems), Set theory, Mapping (Transformations), Optimization, Operations research.
Identifiers: Network theory.

The main theorem of this study provides necessary and sufficient conditions for a locally finite bipartite graph to have a subgraph whose valences lie in prescribed intervals. The theorem is applied to the study of integer-valued flows in locally finite directed graphs. In particular, generalizations of the max-flow min-cut theorem and the circulation theorem are obtained. The axiom of choice is assumed throughout. (Author)
AD-668 421 HC$3.00 MF$0.65

A CAUCHY PROBLEM FOR FREDHOLM INTEGRAL EQUATIONS WITH KERNELS OF THE FORM k1 (t-Y/) + K2(t + Y),
Rand Corp Santa Monica Calif
H. H. Kagiwada, and R. E. Kalaba. Apr 68, 20p
Rept no. RM-5600-PR
Contract F44620-67-C-0045

Descriptors: (*Integral equations, *Cauchy problem), Thermal radiation, Initial value problems, Approximation (Mathematics), Programming (Computers), Problem solving.
Identifiers: Radiative transfer.

The report describes a method for converting Fredholm integral equations with 'spectral' kernels into equivalent initial-value (Cauchy) problems that can be solved effectively by analog or digital computer. In this treatment the upper limit of integration, c, is viewed as an independent variable. An initial-value problem is derived for u (t, c), where u evaluated at a fixed point t is regarded as a function of c. The auxiliary functions R, e, and J, and the function u, satisfy differential-integral equations, subject to initial conditions. In the numerical method, the integrals in the differential equations are approximated by sums according to a quadrature formula. Then the system of differential-integral equations reduces to ordinary differential equations that can easily be solved by a computer. (Author)
AD-668 423 HC$3.00 MF$0.65

COUPLED WAVE EQUATIONS FOR MULTIMODE INHOMOGENEOUS MEDIA. II. SECTION A. ON THE TRANSFORMATION OF THE WAVE EQUATIONS OF AN INHOMOGENEOUS MULTI-WAVE SYSTEM TO COUPLED MODE FORM: SECTION B. ON INHOMOGENEOUS WAVE NUMBERS FOR LONGITUDINAL PROPAGATION IN A MAGNETO-IONIC MEDIUM,
Rydbeck Research Associates Fjaras (Sweden)
or primary bibliographic entry see Field 20N.
AD-668 456 HC$3.00 MF$0.65

TABLES OF DISTRIBUTIONS OF QUADRATIC FORMS IN CENTRAL NORMAL VARIABLES I,
North Carolina Univ Chapel Hill Dept of Statistics
N. L. Johnson, and Samuel Kotz. Dec 67, 82p
Rept no. Mimeo Ser-543
AFOSR-68-0849
Grant AF-AFOSR-1415-68
Prepared in cooperation with Temple Univ., Philadelphia, Pa. Dept. of Mathematics, under grant AF-AFOSR-1411-68. See also AD-668 480.

Descriptors: (*Probability density functions, Tables), (*Distribution functions, Tables), Matrix algebra, Transformations (Mathematics), Approximation (Mathematics), Probability, Random variables, Series.
Identifiers: Truncation error, Computer analysis.

The tables give values of the probability density and cumulative distribution functions of the random variable alpha sub 1 (U sub 1 squared) + alpha sub 2 (U sub 2 squared) + alpha sub 3 (U sub 3 squared) + alpha sub 4 (U sub 4 squared) where the U's are mutually independent unit normal variables, with the alpha's satisfying the condition alpha sub 1 + alpha sub 2 + alpha sub 3 + alpha sub 4 = 4. The tables include sets of alpha values from (2.5, 0.7, 0.4, 0.4) to (1.1, 1.1, 0.9, 0.9) in all 36 sets of alpha values. The tabulated values shown to five decimal places are based on original calculations which should have an error less than 1 in the eighth decimal place. (Author)
AD-668 479 HC$3.00 MF$0.65

TABLES OF DISTRIBUTIONS OF QUADRATIC FORMS IN CENTRAL NORMAL VARIABLES II,
North Carolina Univ Chapel Hill Dept of Statistics
N. L. Johnson, and Samuel Kotz. Dec 67, 151p
Rept no. Mimeo Ser-557
AFOSR-68-0793
Grant AF-AFOSR-68-1415
Prepared in cooperation with Temple Univ., Philadelphia, Pa. Grant AF-AFOSR-68-1411. See also AD-668 479. Research supported in part by National Inst. of General Medical Sciences. Grant 5R01GM-12868.

Descriptors: (*Probability density functions, Tables), (*Distribution functions, Tables), Random variables, Approximation (Mathematics), Series, Probability.
Identifiers: Truncation error, Computer analysis.

The tables give values of the probability density and cumulative distribution functions of the random variable alpha sub 1 (U sub 1 squared) + alpha sub 2 (U sub 2 squared) + alpha sub 3 (U sub 3 squared) + alpha sub 4 (U sub 4 squared) + alpha sub 5 (U sub 5 squared) where the U's are mutually independent unit normal variables, with the alpha's satisfying the condition alpha sub 1 + alpha sub 2 + alpha sub 3 + alpha sub 4 + alpha sub 5 = 5. The tables include sets of alpha values from (3.0, 0.5, 0.5, 0.5, 0.5) to (1.1, 1.1, 1.0, 0.9, 0.9) in all seventy sets of alpha values. The tabulated values, shown to five decimal places, are based on original calculations which should have an error less than 1 in the eighth decimal place.
AD-668 480 HC$3.00 MF$0.65

REVIEW OF NUMERICAL METHODS IN GAS BEARING FILM ANALYSIS,
Columbia Univ New York Lubrication Research Lab
For primary bibliographic entry see Field 13I.
AD-668 500 HC$3.00 MF$0.65

FUNCTIONAL ANALYTIC ANALYSIS OF THE PURSUIT PROBLEM OF KELENDZERIDZE.
California Univ., Los Angeles. Dept. of Engineering.
R. Chattopadhyay. Mar 68, 28p NASA-CR-93739, REPT.-68-6
Grant NSG-237-62

Descriptors: *Functional analysis, *Moments, *Pursuit tracking, Interception, Interceptors, Mathematical models, Optimal control.

For abstract, see STAR 06 10.
N68-19856 HC$3.00 MF$0.65

DESIGN OF LOW SENSITIVITY SAMPLED DATA CONTROL SYSTEMS.
Tennessee Univ., Knoxville. Dept. of Electrical Engineering.
J. E. Bennett, and J. C. Hung. 21 Feb 68, 19p
NASA-CR-93781, SR-17
Grant NSG-351

Descriptors: *Automatic control, *Data sampling, *Systems engineering, Controllers, Domains, Output, Sensitivity, Variations.

For abstract, see STAR 06 10.
N68-20051 HC$3.00 MF$0.65

OPTIMIZED COMPUTATION WITH RECURSIVE POWER SERIES INTEGRATION.
National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

R. H. Estes, and E. R. Lancaster. Mar 68, 13p
NASA-TM-X-63148, X-643-68-80

Descriptors: *Computation, *Power series, *Three body problem, Differential equations, Optimization.

For abstract, see STAR 06 10.
N68-20225 HC$3.00 MF$0.65

THE LIMITING DISTRIBUTION OF THE LIKELIHOOD RATIO STATISTIC -2L N LAMBDA N UNDER A CLASS OF LOCAL ALTERNATIVES, PART 1. MINIMUM AVERAGE RISK DECISION PROCEDURES FOR THE NONCENTRAL CHI-SQUARE DISTRIBUTION, PART 2.
Florida State Univ., Tallahassee.
W. E. Lever. Jan 68, 150p NASA-CR-93817
Contracts NGR-10-004-029, NIH 5-1-GM-913

Descriptors: *Decision making, *Statistical decision theory, *Statistical distributions, Estimating, Gamma function, Normal density functions, Ratios, Risk, Tables (data), Variance (statistics).

For abstract, see STAR 06 10.
N68-20371 HC$3.00 MF$0.65

TRANSPORTATION SCHEDULING UNDER MULTI-DIMENSIONAL DEMANDS.
Massachusetts Inst. of Tech., Cambridge. Dept. of Civil Engineering.
For primary bibliographic entry see Field 15E.
PB-177 527 HC$3.00 MF$0.65

50-POINT TRAFFIC CENSUS-RESULTS FOR 1966.
Road Research Lab., Crowthorne (England).
For primary bibliographic entry see Field 14C.
PB-177 901 HC$3.00 MF$0.65

A STUDY OF METHODS FOR FORECASTING EMPLOYMENT.
Illinois Univ., Urbana. Inst. of Labor and Industrial Relations.
For primary bibliographic entry see Field 5C.
PB-178 008 HC$3.00 MF$0.65

OPTIMUM SAMPLING METHODS.
Oklahoma State Univ., Stillwater. School of Electrical Engineering.
For primary bibliographic entry see Field 9B.
For abstract, see NSA 22 08.
SC-CR-67-2752 HC$3.00 MF$0.65

12B. Operations Research

NEW CORRELATION BETWEEN A HUMAN SUBJECT AND A QUANTUM MECHANICAL RANDOM NUMBER GENERATOR.
Boeing Scientific Research Labs Seattle Wash Plasma Physics Lab
For primary bibliographic entry see Field 5J.
AD-667 953 HC$3.00 MF$0.65

CALCULATION OF EXPECTED DEPLETION TIME WHEN DEMAND IS STUTTERING POISSON.
Army Logistics Management Center Fort Lee Va Amc Inventory Research Office
For primary bibliographic entry see Field 15E.
AD-668 002 HC$3.00 MF$0.65

INVESTIGATING ONE CLASS OF EXTREMUM SYSTEMS OF DISCRETE ACTION UNDER THE INFLUENCE OF RANDOM INTERFERENCES.
Foreign Technology Div Wright-Patterson AFB Ohio
N. M. Aleksandrovskii, and N. E. Madzharov.
28 Jul 67, 15p Rept no. FTD-MT-24-116-67
Edited machine trans. of Izvestiya Vysshikh Uchebnykh Zavedenii. Elektromekhanika (USSR), n7 p733-9 1965.

Descriptors: (*Control systems, Theory), Sampling, Optimization, Automatic, Accuracy, Errors, Noise, Servomechanisms, Nonlinear systems, Differential equations, USSR.
dentifiers: Translations, *Control theory.

An automatic-control system in which the sampled signal is used for both controlling the actuator and forming the control law is theoretically considered. It is assumed that: the plant is first-order linear; the sampling period is much longer than the total time of control operations. It is found that considerable deviations from the absolute optimum do not seriously affect system accuracy; the latter increases up to a certain value of gain; beyond that value, the extremum-tracking error becomes higher again because of the increased hunting amplitude. Recommendations for selecting the optimal system gain are given. Formulas are developed for the steady-state error of the sampling-data system subjected to noise; in these formulas, the plant inertia is allowed for.
AD-668 056 HC$3.00 MF$0.65

CONTINUITY PROPERTIES OF THE CORE OF A MARKET (REVISED VERSION).
Hebrew Univ Jerusalem (Israel) Dept of Mathematics
For primary bibliographic entry see Field 5C.
AD-668 079 HC$3.00 MF$0.65

SEQUENTIAL STATE AND PARAMETER ESTIMATION IN DISCRETE NONLINEAR SYSTEMS.
Aerospace Corp Patrick AFB Fla Eastern Test Range Office
George W. Masters, Jr. Apr 68, 147p Rept no. TR-0158 (3306)-1
SAMSO-TR-68-163
Contract F04695-67-C-0158

Descriptors: (*Thermal reactors, *Reactor kinetics), Sequential analysis, Nonlinear systems, Matrix algebra, Least squares method, Boundary value problems, Probability, Information theory, Mathematical models, Reentry vehicles, Atmosphere entry, Theses.
Identifiers: On-line systems, Pontryagin's maximum principle, Invariant imbedding, Estimation theory, Optimal control theory.

The work presented in this report derives a sequential method for on-line estimation of the state variables and parameters of discrete, non-linear, dynamical systems. A discrete version of Pontryagin's Maximum Principle is employed to obtain the canonic equations of the least-squares optimal estimator. A discretized invariant imbedding technique is then applied to solve the resulting two-point boundary value problem. Finally, a system of sequential equations is obtained by application of variational methods to the optimal trajectory. The result is a sequential estimation scheme conceptually related to existing methods developed for continuous systems. The method presented has the advantage of direct applicability to discrete systems and provides for the inclusion of higher-order terms not usually considered by other methods. As a result of these inherent features, the process has been found to provide a faster, more stable estimate of the system variables. In addition, a minimum of a-priori statistical information is required. (Author)
AD-668 116 HC$3.00 MF$0.65

APPLICATIONS OF BALANCED TREE SEARCH.
Rand Corp Santa Monica Calif
Bennett Fox. Apr 68, 19p Rept no. RM-5623-PR
Contract F44620-67-C-0045
Descriptors: (*Operations research, Problem solving), (*Programming (Computers), Inventory control), Algorithms, Efficiency, Optimization, Data storage systems, Management planning.
Identifiers: *Balanced tree search, List processing, Allocation processes.

It is shown how balanced tree searching can accelerate incremental allocation and branch and bound algorithms by an order of magnitude. (Author)
AD-668 119 HC$3.00 MF$0.65

A RENEWAL THEORETIC APPROACH TO A FIRST PASSAGE TIME PROBLEM OCCURRING IN A NEURON FIRING MODEL.
Johns Hopkins Univ Baltimore Md Dept of Statistics
For primary bibliographic entry see Field 6D.
AD-668 149 HC$3.00 MF$0.65

BOUNDS FOR MAXIMAL TEMPORALLY REPEATED FLOWS IN A NETWORK.
Scientific rept.,
George Washington Univ Washington D C Logistics Research Project
Donald J. Hunt, and W. L. Wilkinson. 19 Mar 68, 93p Rept no. Serial-T-204
Contract N00014-67-A-0214

Descriptors: (*Operations research, Graphics), (*Transportation, Networks), (*Flow charting, Networks), Logistics, Linear programming, Optimization, Management planning, Scheduling, Costs, Algorithms, Programming (Computers), Subroutines.
Identifiers: *Capacitated transshipment problem.

This paper is addressed to the capacitated transshipment problem. A Push/Pull Algorithm is described which is a variation of the Ford and Fulkerson Algorithm. Both algorithms solve either the minimal cost flow or maximal dynamic flow problem. A supplementary procedure, a Bounded Flow Algorithm, employs the Push/Pull Algorithm to determine the arc flow bounds for alternative optimal solutions. A theorem is offered concerning these bounds. The logic for the computer programs is described together with some observations on computing efficiency with network algorithms. The paper concludes with a network example and numerical results. (Author)
AD-668 174 HC$3.00 MF$0.65

A REMARK ON THE 'BANG-BANG' PRINCIPLE FOR LINEAR CONTROL SYSTEMS IN INFINITE-DIMENSIONAL SPACE.
Scientific Interim rept.,
Brown Univ Providence R I Div of Applied Mathematics
H. O. Fattorini. Apr 68, 7p
AFOSR-68-0768
Grant AF-AFOSR-693-67
Availability: Published in SIAM J. Control, v6 n1 p109-13 1968.

Descriptors: (*Linear systems, Functional analysis), Control systems, Approximation (Mathematics), Measure theory, Convex sets, Banach space, Operators (Mathematics), Cauchy problem, Theorems.
Identifiers: Bang-bang principle.

The 'bang-bang' principle for linear control systems (1.1) u prime (t) = A (t)u (t) + B (t)f (t) in finite-dimensional space E superscript n can be stated as follows: If the system (1.1) can be steered from a point u epsilon E superscript n to another point v epsilon E superscript n in a given time t sub 1 > 0 by a control f taking values, say, in the unit cube K of E superscript m, then the transfer of (1.1) from u to v can also be achieved in the same time by another control f sub o taking values in K sub o, the set of extremal points of K. The 'bang-bang' principle does not hold in infinite-dimensional spaces; in fact, it is easy to construct

control systems, even with A and B time-independent where the final state v at a given time t2 depends uniquely on the control f. However, the principle subsists if one is content with approximating (and not actually attaining) the final state. Moreover, it turns out that one can also approximate the whole trajectory between u and v by means of K sub o-valued controls (Theorem 1).
AD-668 281 Not available from CFSTI.

CLASSIFICATION AND DISCRIMINATION IN THE ANALYSIS OF CREDIT RISKS: II.
Carnegie-Mellon Univ Pittsburgh Pa Management Sciences Research Group
For primary bibliographic entry see Field 5C.
AD-668 322 HC$3.00 MF$0.65

AN ALGORITHM FOR DIFFERENTIABLE CONVEX FUNCTIONAL PROGRAMMING WITH EXAMPLES AND APPLICATIONS TO LINEAR PROGRAMMING UNDER UNCERTAINTY.
Research rept.,
Carnegie-Mellon Univ Pittsburgh Pa Management Sciences Research Group
R. Jagannathan. Aug 67, 47p Rept no. RR-114
Contract Nonr-760 (24)

Descriptors: (*Linear programming, *Uncertainty), Problem solving, Decision theory, Probability, Budgets, Functions, Flow charting, Optimization, Management planning, Mathematical programming, Mathematical models, Iterative methods, Algorithms.
Identifiers: *Convex programming, Capital budgeting model, Portfolio selection model.

The literature pertaining to linear programming under uncertainty is characterized by three major approaches, (i) Stochastic linear programming, (ii) chance constrained programming and (iii) Two-stage (in general m-stage) linear programming under uncertainty. These approaches offer a rich array of potential application possibilities provided algorithms can be made available to obtain solutions for any of the formulations that might be achieved. The present paper is directed to a study of some of the algorithmic possibilities with special reference to linear programming under uncertainty. More generally in Section 3 of this paper, a computational algorithm is developed for solving any convex programming problem with linear constraints when the criterion function has continuous derivatives. In Sections 4, 5, and 6 the applicability of the proposed procedure for solving a two-stage LP Model under three sets of assumptions regarding the stochastic nature of the defining parameters (A, B, c) is discussed. As illustrative examples, the capital budgeting and Portfolio Selection Models are considered in some detail. (Author)
AD-668 323 HC$3.00 MF$0.65

SPECTRAL METHODS IN ECONOMETRICS,
Rand Corp Santa Monica Calif
For primary bibliographic entry see Field 5C.
AD-668 364 Not available from CFSTI.

TABLES OF VALUES AND SHOOTING TIMES IN NOISY DUELS.
Technical summary rept.,
Wisconsin Univ Madison Mathematics Research Center
Martin Fox, and George S. Kimeldorf. Feb 68, 24p Rept no. MRC-TSR-853
Contract DA-31-124-ARO (D)-462

Descriptors: (*Game theory, Problem solving), Probability, Set theory, Mapping (Transformations), Numerical methods and procedures, Convergence, Decision theory, Computer programs, Tables.
Identifiers: Duels, Accuracy functions, FORTRAN.

A noisy duel is a zero-sum, two-person game with the following structure: Each player has bullets which he can fire at any times in (0, 1). If Player i fires at time t, he hits with probability P sub i (t). The functions P sub i are continuous and nondecreasing with P sub i (0) = 0 and P sub i (1) = 1. The number of bullets each player possesses at any time and the functions P sub i are known to both. The payoff is 1 to the sole survivor, otherwise 0. This paper reviews the authors' earlier work on the existence of values and the structure of epsilon-good strategies. Tables of values and shooting times for noisy duels are presented, which, in some cases, can be used to trace the play of the game. An additional table illustrates how large an arsenal is necessary to overcome the effects of an opponent's superior accuracy. (Author)
AD-668 388 HC$3.00 MF$0.65

VALUES OF NOISY DUELS WITH NOT-NECESSARILY EQUAL ACCURACY FUNCTIONS.
Technical summary rept.,
Wisconsin Univ Madison Mathematics Research Center
Martin Fox, and George S. Kimeldorf. Jan 68, 20p Rept no. MRC-TSR-832
Contract DA-31-124-ARO (D)-462

Descriptors: (*Game theory, Problem solving), Probability, Set theory, Decision theory, Numerical methods and procedures, Theorems.
Identifiers: Duels, Accuracy functions.

Let G sub mn (P sub 1, P sub 2) be the noisy duel in which the first player has m bullets with accuracy function P sub 1 and the second player has n bullets with accuracy function P sub 2 where m, n, P sub 1, and P sub 2 are known to both players. Results are well known for the duels in which P sub 1 = P sub 2 or when m = n = 1. The following theorem is proved: If P sub 1 and P sub 2 are nondecreasing and continuous on (0, 1) with P sub 1 (0) = P sub 2 (0) = 0 and P sub 1 (1) = P sub 2 (1) = 1, then the game G sub mn (P sub 1, P sub 2) has a value. We discuss the structure of epsilon-good strategies and introduce the concept of a good first-shot time. It is shown that although good strategies may not exist, at least one of the players always has a good first-shot time. (Author)
AD-668 389 HC$3.00 MF$0.65

OPTIMAL REGULATION OF NONLINEAR DYNAMICAL SYSTEMS.
Technical summary rept.,
Wisconsin Univ Madison Mathematics Research Center
D. L. Lukes. Feb 68, 37p Rept no. MRC-TSR-844
Contract DA-31-124-ARO (D)-462

Descriptors: (*Control systems, *Optimization), (*Nonlinear differential equations, Control systems), Feedback, Matrix algebra, Power series, Analytic functions, Inequalities, Numerical analysis, Perturbation theory, Theorems, Theses.
Identifiers: Optimal control theory, Stability matrix.

The paper develops a theory of optimal control for processes described by autonomous systems of nonlinear ordinary differential equations. The admissible controls are feedback devices which operate on the sensed state of the system to automatically generate control signals that return the system to a prescribed state of equilibrium whenever an impulsive disturbance occurs. An optimal control is defined by means of a performance integral that provides a basis of comparison between certain feedback controls. By assuming that the process is stabilizable the existence and uniqueness of an optimal control is proved. Both C superscript omega and C superscript 2 systems are treated and several examples are discussed. (Author)
AD-668 396 HC$3.00 MF$0.65

BALANCING OF PARTIAL OPTIMA BY MEANS OF A LEARNING MONTE CARLO APPROACH. AN APPLICATION IN UNDERGROUND COAL MINING.
Carnegie-Mellon Univ Pittsburgh Pa Management Sciences Research Group
For primary bibliographic entry see Field 8I.
AD-668 484 HC$3.00 MF$0.65

ESSENTIAL PARAMETERS IN SENSITIVITY ANALYSIS,
Illinois Univ Urbana Coordinated Science Lab
Dennis F. Wilkie, and William R. Perkins. Apr 68, 49p Rept no. R-376
Contract DAAB07-67-C-0199, Grant AFOSR-931-67

Descriptors: (*Control systems, Sensitivity), Systems engineering, Optimization, Matrix algebra, Flow charting, Transformations (Mathematics), Mathematical models, Algorithms.
Identifiers: *Sensitivity analysis, Sensitivity functions, Leverrier algorithm, Computer simulation.

A method is developed to generate by one nth order sensitivity model all the sensitivity functions the partial derivative of x sub i with respect to q sub j, q superscript o, i = 1,...,n,j = 1,...,r for a single input, linear, time-invariant, controllable nth order system which depends on r different parameters. This represents an improvement over known methods for generating the sensitivity functions, which generally require a composite dynamic system of order n (r + 1). In the development, two useful properties of the sensitivity functions of the states of the companion form of a system (i.e. the system A matrix is in companion form) are used. It is shown that all the sensitivity functions of the states of the companion form system can be generated by linear combinations of the signals on one sensitivity model of the system and the system states. The Leverrier algorithm has been extended so that the method of the paper is readily implemented on a digital or hybrid computer. Finally, an example is given, demonstrating how the technique of the paper can result in considerable time savings in the computer simulation and sensitivity analysis of systems. (Author)
AD-668 486 HC$3.00 MF$0.65

A NOTE ON A SIMULATED STOCK MARKET,
Yale Univ New Haven Conn Cowles Foundation for Research in Economics
For primary bibliographic entry see Field 5C.
AD-668 489 HC$3.00 MF$0.65

CPM AND DCPM UNDER RISK.
Research rept.,
Carnegie Inst of Tech Pittsburgh Pa Management Sciences Research Group
Gerald L. Thompson. Mar 68, 17p Rept no. RR-130
Contract Nonr-760 (24)

Descriptors: (*Mathematical programming, Uncertainty), (*Decision theory, Management planning), (*Management planning, *Scheduling), Statistical distributions, Probability, Flow charting, Computer programs.
Identifiers: *Critical path method, *Decision critical path method, Probabilistic programming, Computer analysis.

The Critical Path and Decision Critical Path Methods are extended to the case in which the (non-decision) jobs have distributions of job times. These new models are discussed in the light of recent literature on probabilistic programming. Also the practical problem of obtaining data and utilizing the results of computations is discussed. (Author)
AD-668 490 HC$3.00 MF$0.65

RELAXATION AND THE DUAL METHOD IN MATHEMATICAL PROGRAMMING,
California Univ Los Angeles Western Management Science Inst
Arthur Geoffrion. Mar 68, 30p Rept no. WMSI Working Paper-135
Contract Nonr-233 (75)

Descriptors: (*Mathematical programming, Problem solving), Iterations, Simplex method, Inequalities, Optimization, Linear programming, Theorems.
Identifiers: Dual method.

The tactic of 'relaxation' has often been used in one guise or another in order to cope with mathematical programs with a large number of constraints, some or all of which may be only implicitly available. By 'relaxation' one means the solution of a given problem via a sequence of smaller problems that are relaxed in that some of the inequality constraints are temporarily ignored. Relaxation has been used primarily in the context of linear programming, but in this paper a version that is valid for a general class of concave programs is examined. Constraints are dropped as well as added from relaxed problem to relaxed problem. A specialization to the completely linear case is shown to be equivalent to Lemke's Dual Method. This result permits some pertinent inferences to be drawn from the extensive computational experience available for the (primal) Simplex Method. Other matters pertaining to computational efficacy are discussed. An interpretation of relaxation in terms of the dual in the nonlinear case is also established. The optimal multipliers generated by successive relaxed problems turn out to comprise a sequence of improving feasible solutions to the minimax dual. When interpreted in this way, it becomes apparent that relaxation corresponds to just the opposite tactic -- called 'restriction' -- applied to the dual problem. Restriction is an equally interesting and useful tactic in its own right, and its main features are outlined. (Author)
AD-668 494 HC$3.00 MF$0.65

ON INCREASE OF SPEED OPERATION OF CERTAIN SYSTEMS OF AUTOMATIC CONTROL,
Foreign Technology Div Wright-Patterson AFB Ohio
For primary bibliographic entry see Field 13H.
AD-668 513 HC$3.00 MF$0.65

TECHNIQUE FOR AREA PLANNING: A MANUAL FOR THE CONSTRUCTION AND APPLICATION OF A SIMPLIFIED INPUT-OUTPUT TABLE.
Regional Economic Development Inst., Inc., Pittsburgh, Pa.
For primary bibliographic entry see Field 5C.
PB-178 058 HC$3.00 MF$0.65

13. MECHANICAL, INDUSTRIAL, CIVIL, AND MARINE ENGINEERING

13A. Air Conditioning, Heating, Lighting, and Ventilating

AIR DISTRIBUTION STUDIES IN MULTI-ROOM SHELTERS.
Final rept.,
Protective Structures Development Center Fort Belvoir Va
Oddvar W. Svaeri, and Norman I. Stein. Mar 67, 196p Rept no. PSDC-TR- (21-22)

Descriptors: (*Fallout shelters, *Ventilation), Ventilation fans, Ventilation ducts, Gas flow, Temperature, Configuration, Instrumentation, Civil defense systems.
Identifiers: *Punkahs (Oriental).

Ventilation studies for determining the effectiveness of manual air moving devices were conducted in the multi-room adiabatic mock-up shelter at the Protective Structures Development Center. The air moving devices used in the study were adapted from the Oriental Punkah, a device used to fan a room. They are low in cost, of simple construction, rugged and durable, can be stored indefinitely under most conditions, and are capable of circulating relatively large volumes of air at extremely low power requirements. Observations of the air distribution and velocity patterns within all shelter rooms for various configurations and ventilation rates indicates that punkahs exert a significant influence. Punkahs provide an inexpensive, simple, durable, and efficient method of improving the ventilation and habitability of fallout shelter spaces. (Author)
AD-667 911 HC$3.00 MF$0.65

ELECTROSIMULATION OF HEAT EXCHANGE IN HEAT EXCHANGERS OF THE REGENERATIVE TYPE,
Foreign Technology Div Wright-Patterson AFB Ohio
V. P. Veselov, and A. V. Temnikov. 5 Sep 67, 15p Rept no. FTD-MT-24-119-67
Edited machine trans. of Aviatsionnyi Institut, Kuibyshev. Trudy (USSR) n15 p287-93 1963.

Descriptors: (*Heat exchangers, *Heat transfer), Mathematical models, Partial differential equations, Programming (Computers), Mathematical analysis, Correlation techniques, Thermodynamics, Problem solving, Convection (Heat transfer).
Identifiers: Computer simulation, Translations.

The report considers a regenerative type heat exchanger of the most simple type. The mathematical problem of heat transfer in such a regenerator reduces to the solution of two partial differential equations. A mathematical method is presented for solution of these equations on an analog computer. Comparisons of the results of this simulation method with analytical solutions are shown in two figures. It is stated that the proposed method can be used also for investigation of heat transfer in a fixed bed of particle material, blown through by a stream of gas, and for investigation of the temperature of the heat transfer medium in countercurrent flow in a regenerator. The method is claimed to be sufficiently accurate for engineering purposes. (Author)
AD-668 032 HC$3.00 MF$0.65

DSPERSIVE FILTER IN A CONTROL LOOP,
National Research Council of Canada Ottawa (Ontario) Radio and Electrical Engineering Div
E. L. R. Webb. 13 Dec 67, 1p
NRC-9972
Availability: Published in Electronics Letters, v4 n1 1968.

Descriptors: (*Temperature control, Models (Simulations)), Electrical networks, Thermometers, Feedback, Oscillation, Stability, Low-pass filters, Transmission lines, Gain.
Identifiers: Equivalent circuits, Distributed RC networks.

The effect of a distributed-RC filter or transmission line on the behaviour of a control system is examined, and a useful model for a class of proportional temperature controllers is derived. (Author)
AD-668 043 Not available from CFSTI.

ANALYSIS OF PRESSURE-DROP FUNCTION IN RANKINE SPACE POWER BOILERS WITH DISCUSSION OF FLOW MALDISTRIBUTION IMPLICATIONS.
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
D. R. Packe, and A. A. Schoenberg. Apr 68, 64p NASA-TN-D-4498
Contract 701-04-00-02-22

Descriptors: *Counterflow, *Flow characteristics, *Mathematical models, *Pressure drop, *Rankine cycle, Boilers, Functional analysis, Functions (mathematics), Heat transfer, Space power unit reactors.

For abstract, see STAR 06 10.
N68-20066 HC$3.00 MF$0.65

PERFORMANCE OF A MULTITUBE SINGLE-PASS COUNTERFLOW NA K-COOLED MERCURY RANKINE-CYCLE CONDENSER.
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
J. S. Curreri, R. P. Macosko, and R. H. Soeder. Apr 68, 42p NASA-TM-X-1548
Contract 701-04-00-02-22

Descriptors: *Equilibrium flow, *Heat exchangers, *Liquid cooled reactors, *Mercury (metal), *Performance tests, *Rankine cycle, Nuclear power reactors, Potassium, Snap 8, Sodium, Thermal simulation.

For abstract, see STAR 06 10.
N68-20340 HC$3.00 MF$0.65

GAS-FIRED ('INFRA-RED') HEATER FOR USE ON THE JOINTS IN WEARING-COURSE ROLLED ASPHALT,
Road Research Lab., Crowthorne (England).
For primary bibliographic entry see Field 13B.
PB-177 902 HC$3.00 MF$0.65

13B. Civil Engineering

STERILIZATION ACTION OF CHLORINE AND IODINE ON BACTERIA AND VIRUSES IN WATER SYSTEMS.
Annual rept. 1 Jul 63-28 Feb 64,
Johns Hopkins Univ., Baltimore, Md. School of Hygiene and Public Health.
Cornelius W. Kruse, and Yu-Chih Hsu. 28 Feb 64, 12p
Contract DA-49-193-MD-2314

Descriptors: (*Water supplies, *Sterilization), (*Germicides, Bacteriophages), Iodine, Chlorine, Viruses, Ribonucleic acids, Proteins, pH, Desoxyribonucleic acids.

Effect of iodine on bacterial RNA virus (F2): iodine reacts best with some viruses at pH values between 6 and 8, and at much higher or lower PH than delimited by the range. The inactivation of virus will be materially reduced. The presence of the iodide ion will greatly reduce the inactivation of some viruses. Probable mode of action of iodine on bacterial virus (F2): the reaction of iodine with sulfhydryl groups of the protein coat apparently is not responsible for the complete inactivation of the virus. Iodination of the tyrosin was effective provided no significant amounts of iodide was in the system. (Author)
AD-430 343 HC$3.00

CONTINUOUS POTABLE WATER SUPPLY FOR FALLOUT SHELTERS AND OTHER ISOLATED SITES.
Final rept. 1 Aug 62-31 Jul 64,
Northwestern Univ., Evanston, Ill. Technological Inst.
J. E. Quon, and R. B. Grieves. 31 Jul 64, 73p
Contract DA-49-193-MD-2316

Descriptors: (*Shelters, Radioactive fallout), (*Water supplies, Shelters), Recovery, Ion exchange, Urine, Urea, Adsorption, Oxidation, Hydrolysis, Purification, Portable.

This investigation centers on the evaluation and possible development of physical chemical methods for the conversion of urine into water suitable for drinking or other uses in fallout shelters and other isolated sites. The capacity of the multiple and mixed bed ion exchange for the demineralization of urine; and of activated carbon for the removal of urea, foaming agents, and color were evaluated. Reaction rates and products were determined for the oxidation of urea with calcium hypochlorite and with nitrous acid. The hydrolysis of urea without buffer using the enzyme urease was explored. A strongly acidic sulfonated polystyrene exchange resin was found to be effective for the removal of urea from urine. Experiments on the precipitation

of chloride and carbonate, either present in urine or a reaction product, with silver salts were conducted. (Author)
AD-450 653 HC$3.00

PREDICTING DIFFUSION OF ATMOSPHERIC CONTAMINANTS BY CONSIDERATION OF TURBULENT CHARACTERISTICS OF WSMR,
Atmospheric Sciences Lab White Sands Missile Range N Mex
For primary bibliographic entry see Field 4B.
AD-667 920 HC$3.00 MF$0.65

WATER CONTAINER LINER.
General American Transportation Corp Niles Ill
General American Research Div
For primary bibliographic entry see Field 13D.
AD-667 965 HC$3.00 MF$0.65

SOIL COMPACTION INVESTIGATION: REPORT 10. EVALUATION OF VIBRATORY ROLERS ON THREE TYPES OF SOILS.
Army Engineer Waterways Experiment Station Vicksburg Miss
For primary bibliographic entry see Field 8L.
AD-667 966 HC$3.00 MF$0.65

EVALUATION OF A VIBRATING SPADE TO ELIMINATE SURFACE VOIDS ON FORMED CONCRETE SURFACES.
Army Engineer Waterways Experiment Station Vicksburg Miss
For primary bibliographic entry see Field 11B.
AD-667 967 HC$3.00 MF$0.65

QUESTIONS OF ATMOSPHERIC DIFFUSION AND AIR POLLUTION: SELECTED ARTICLES.
Foreign Technology Div Wright-Patterson AFB Ohio
27 Sep 67. 40p Rept no. FTD-MT-24-186-67
Edited machine trans. of Glavnaya Geofizicheskaya Observatoriya, Leningrad. Trudy (USSR) n172 p23-34, 42-7, 74-8 1965.

Descriptors: (*Air pollution, Meteorological parameters), (*Atmospheric motion, Air pollution), Power plants (Establishments), Waste gases, Sulfur compounds, Dioxides, Inorganic acids, Wind, Diffusion, USSR.
Identifiers: Sulfurous acid, Translations.

Contents: Results of analysis of experimental data characterizing the distribution of atmospheric pollutions near the thermal electric power stations; Analysis of dispersion of horizontal oscillations of the wind direction; The question of horizontal scattering of impurity in the atmosphere.
AD-668 053 HC$3.00 MF$0.65

SOME COMMENTS ON URBAN RESEARCH,
Rand Corp Santa Monica Calif
S. N. Genensky. Apr 68. 15p Rept no. P-3827
Prepared for presentation at the IEEE Meeting at Space Technology Labs., Los Angeles, Calif., 19 Mar 68.

Descriptors: (*Urban planning, Scientific research), Fire safety, Public health, Housing, Police, Urban areas, Budgets, Problem solving, Predictions, Decision making, Management planning, Research program administration.

A discussion is presented of research efforts for the City of New York, along with a general discourse on some of the advantages and disadvantages of involvement in urban research. (Author)
AD-668 070 HC$3.00 MF$0.65

A FEASIBILITY STUDY OF A REMOTE AREA LAND TRANSPORTATION CONCEPT.
Battelle Memorial Inst., Columbus, Ohio. Remote Area Conflict Information Center.
For primary bibliographic entry see Field 13F.
AD-815 392 HC$3.00 MF$0.65

SCIENTIFIC PROGRESS AND FACILITIES OF THE LATVIAN SSR,
Joint Publications Research Service, Washington, D. C.
N. Kravchenok, and V. Zyuzyukin. 10 Jan 68. 13p
Nauka i Tekhnika (Latvian SSR) n10 p2-6, 14-16 1967.

Descriptors: (*Scientific research, *USSR), (*Medicine, USSR), History, Reports, Diseases, Vitamins.
JPRS-43944 HC$3.00 MF$0.65

CALCULATIONS OF HEIGHT OF VENTILATION STACKS FOR DISCHARGING AIR CONTAMINATED WITH RADIOACTIVE MATERIALS,
Joint Publications Research Service, Washington, D. C.
V. M. Krupchatnikov. 11 Jan 68. 17p
Trans. of Vodosnabzhenie i Sanitarnaya Tekhnika (USSR) n10 p30-4 1967.

Descriptors: (*Waste gases, *Radiological contamination), Venting, Structures, Design, Radioactive isotopes, Concentration (Chemistry), Wind, Velocity, USSR.
Identifiers: Smoke stacks.

The following formula is recommended for determining the height of stacks discharging gases containing radioactive substances: Z = (The square root of (G/ (8.5 wC)))M; where Z is the effective height of the discharge measured from ground level at the stack base (in meters), G is the rated quantity of material discharged from the stack (in milligrams/sec.), w is the wind velocity at the height of air discharge (in meters/sec.), and C is the maximum concentration of material discharged in the air at a point where the aerial jet touches the ground (in milligrams/cubic meter).
JPRS-43977 HC$3.00 MF$0.65

INVENTORY OF FREEWAY OPERATION. BACKGROUND INFORMATION,
California State Div. of Highways. Freeway Operation Dept.
Justin True. 23 Jun 67. 12p Rept. no. 67-2
Prepared in cooperation with Bureau of Public Roads, Washington, D. C.

Descriptors: (*Traffic, Analysis), Roads, Control systems, Operation, Time-interval counters, Aerial photographs, Photointerpretation, Recording systems, Recording paper, Human engineering.
Identifiers: Traffic engineering, Freeways.

This report presents a method of observing and displaying how a section of freeway operates. The data is collected by aerial photography supplemented by traffic counts on the ground. Freeway operation or performance is depicted by a traffic density contour map. A density contour map depicting traffic conditions on a section of the Harbor Freeway in Los Angeles is included in the report.
PB-177 468 HC$3.00 MF$0.65

AN INFORMATION SYSTEM DEVELOPMENT PROGRAM.
CONSAD Research Corp., Pittsburgh, Pa.
For primary bibliographic entry see Field 5B.
PB-177 809 HC$3.00 MF$0.65

APPLICATIONS OF STATISTICAL SPECIFICATIONS FOR HIGHWAY CONSTRUCTION,
California State Div. of Highways. Materials and Research Dept.
R. O. Watkins. 3 Feb 68. 17p
Prepared for presentation at the California Transportation and Public Works Conference (1968) University of the Pacific, January 31-February 3, 1968. Prepared in cooperation with Bureau of Public Roads, Washington, D. C.

Descriptors: (*Roads, Construction materials), (*Construction materials, Specifications), Quality control, Reliability, Tests, Statistical analysis, Pavements, Asphalt, Trafficability, Soil mechanics.
Identifiers: Highway engineering.

A brief summary of the study titled 'Application of Statistical Quality Control Methods' in the form of a paper for presentation at a technical conference, outlining the application of statistical quality control methods for analysis of data on determination of penetration tests as asphalt, gradation of aggregate, compaction of embankments and the use of control charts of moving averages, the report does not attempt to specify frequency of sampling nor define the lot of material. The State is working towards the goal of developing more enforceable specifications.
PB-177 876 HC$3.00 MF$0.65

EFFECT OF THE ADVISORY 'GIVE WAY' RULE AT UXBRIDGE CIRCUS ROUNDABOUT,
Road Research Lab., Crowthorne (England).
C. R. Faulkner. 1967. 17p RRL-LR118

Descriptors: (*Traffic, *Control systems), Safety, Efficiency, Reaction (Psychology), Performance (Human), Behavior, Attitudes, Warning systems, Great Britain, Effectiveness.

Traffic movements at Uxbridge Circus roundabout on Western Avenue (A40) were studied before and after the introduction in November 1966 of the advisory give-way rule for roundabouts. As this roundabout was near several involved in the long 83-site experiment it was not surprising to find that drivers were mostly obeying the convention of right-hand priority before the announcement of the rule. No overall significant changes were found in capacity, precedence, or gap acceptance, or in the distribution of vehicles in peak period flow. There was no increase in the proportion (less than 10% of cars observed) which were delayed for 20 seconds or more after passing a point 50 yards before the roundabout. There was evidence of a slight reduction of approach speeds. There was also evidence that the formalisation of the priority rule tended to increase the difficulty on one part of the roundabout, where peak congestion was already being caused by a restricted exit road.
PB-177 900 HC$3.00 MF$0.65

GAS-FIRED ('INFRA-RED') HEATER FOR USE ON THE JOINTS IN WEARING-COURSE ROLLED ASPHALT,
Road Research Lab., Crowthorne (England).
B. F. Buglass. 1967. 11p RRL-LR123

Descriptors: (*Heaters, *Road-building equipment), Effectiveness, Efficiency, Structural properties, Materials, Asphalt, Bituminous coatings, Porosity, Thermal properties, Thermistors, Thermocouples, Roads, Aging (Materials), Great Britain.

This report describes observations and measurements made at sites where a gas-fired heater, attached to a paving machine, was used to heat the adjacent cold wearing-course material so that, without cutting back and 'painting', a sound waterproof joint would result. Further measurments were made under Laboratory conditions to assess the effectiveness of this heater. The results indicate that the heater attachment can produce a satisfactory joint without damage to the asphalt in normal working conditions. Tests were not carried out at a low ambient temperatures but the results obtained suggest that the technique can be employed to make satisfactory joints in cold weather.
PB-177 902 HC$3.00 MF$0.65

A COMPARISON OF SHOPPING TIMES IN 'HIGH-STREET' AND 'PRECINCT' TYPES OF SHOPPING AREA,
Road Research Lab., Crowthorne (England).
G. D. Jacobs. 1968. 23p RRL-LR150

Descriptors: (*Urban planning, *Commerce), Sociology, Economics, Population, Great Britain,

Distribution (Economics), Urban areas, Statistical analysis, Traffic.
Identifiers: Shopping centers, Pedestrians, Traffic engineering.

The time taken to complete a standardised shopping trip was studied in seven High-Street areas (i.e. typical towns with shops sited on either side of a main road), four precinct areas (i.e. towns built in recent years which possess vehicle-free shopping areas) and two newly developed High-Street areas. The trips were made on foot and began and ended at a car park. The number of busy roads crossed per trip was noted, the delay incurred was estimated, and the frequency of pedestrian accidents in each area during a three-year period was obtained. (Author)
PB-177 904 HC$3.00 MF$0.65

RESEARCH TO IMPROVE THE PROCESS OF ACCIDENT INVESTIGATION, VOLUME I.
Cornell Aeronautical Lab., Inc., Buffalo, N. Y.
For primary bibliographic entry see Field 13L.
PB-177 907 HC$3.00 MF$0.65

PLANT REQUIREMENTS FOR MANUFACTURE OF SANITARY WARE.
International Cooperation Administration, Washington, D. C. Technical Aids Branch.
For primary bibliographic entry see Field 13H.
PB-177 923 HC$3.00 MF$0.65

JAROSLAV CERNI INSTITUTE FOR DEVELOPMENT OF WATER RESOURCES: TRANSACTIONS, VOL. 14, NO. 40, 1967.
National Science Foundation, Washington, D. C. Special Foreign Currency Science Information Program.
For primary bibliographic entry see Field 8H.
TT-67-58016-1 HC$3.00 MF$0.65

13C. Construction Equipment Materials, and Supplies

STABILIZATION OF SUB-BASE AND BASE MATERIALS FOR PAVEMENT.
Estabilization de Materiales Para Sub-base Y Base de Pavimentacion
Universidad Autonoma de San Luis Potosi (Mexico). Escuela de Ingenieria.
J. F. Sandoval. 1967, 121p
Lang- in Spanish

Descriptors: *Asphalt, *Calcium oxides, *Cements, *Pavements, *Stabilization, Foundations, Hydrates, Roads, Substrates.

For abstract, see STAR 06 10.
N68-20393 HC$3.00 MF$0.65

ASPHALT COVERINGS FOR HIGHWAYS AND FOR AIRPORT RUNWAYS.
Carpetas Asfalticas Para Carreteras Y Aeropistas
Universidad Autonoma de San Luis Potosi (Mexico). Escuela de Ingenieria.
R. S. Ramirez. 1966, 118p
Lang- in Spanish

Descriptors: *Asphalt, *Highways, *Pavements, *Runways, Coatings, Composite materials, Coverings.

For abstract, see STAR 06 10.
N68-20499 HC$3.00 MF$0.65

THE UNIFORMITY OF DISTRIBUTION OF COATED CHIPPINGS BY MECHANICAL SPREADERS,
Road Research Lab., Crowthorne (England).
W. L. Russell. 1967, 15p RRL-LR83

Descriptors: (*Road-building equipment, *Efficiency), Roads, Materials, Asphalt, Structural properties, Effectiveness, Porosity, Aging (Materials), Great Britain, Bituminous coatings, Distribution.

This report describes some measurements of the uniformity of distribution of coated chippings on wearing-course asphalt by the mechanical spreaders. The uniformity of distribution is assessed from the variability in the number of chippings found in test areas of 1 sq. ft. (Author)
PB-177 894 HC$3.00 MF$0.65

13D. Containers and Packaging

WATER CONTAINER LINER.
Final rept. Mar-Sep 67,
General American Transportation Corp Niles Ill General American Research Div
R. B. Neveril, and A. L. Kapil. Sep 67, 48p Rept no. GARD-1427-F
Prepared in cooperation with Stanford Research Inst., Menlo Park, Calif.

Descriptors: (*Water supplies, *Containers), Polyethylene plastics, Bags (Containers), Compatibility, Germicides, Sodium compounds, Hypochlorites, Seals, Reliability, Encapsulation, Fallout shelters, Wastes (Sanitary engineering), Storage tanks.

New materials and designs for OCD 17-1/2 gallon water containers were investigated. Recommendations are given for upgrading the present 'bag-type' liners and for making a more reliable blow molded, stackable liner. Packaging of the water disinfectant is also recommended to prevent an excess amount from being added to the water, since this contributes to liner failures. (Author)
AD-667 965 HC$3.00 MF$0.65

CRYOGENIC POSITIVE EXPULSION BLADDERS.
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
R. F. Lark. Apr 68, 18p NASA-TM-X-1555
Contract 128-08-08-26-22
Refs Conf- Presented At the 1st Ann. Cryog. Polymers Conf., Cleveland, 25-27 Apr. 1967 Spon-Sponsored By Case Inst. of Technology

Descriptors: *Cryogenic fluid storage, *Low temerature tests, *Polymeric films, Cryogenic rocket propellants, Expandable structures, Expulsion, Fatigue life, Flexibility, Propellant tanks, Propellant transfer.

For abstract, see STAR 06 10.
N68-20329 HC$3.00 MF$0.65

INTEGRAL TANKS OF THE CRYOGENIC STAGE H3,5.
Societe L Air Liquide, Sassenage (France). Centre D'etudes Gryogeniques.
For primary bibliographic entry see Field 21I.
or abstract, see STAR 06 10.
N68-20400 HC$3.00 MF$0.65

PLANT REQUIREMENTS FOR MANUFACTURE OF BUCKETS, PAILS AND PANS.
International Cooperation Administration, Washington, D. C. Technical Aids Branch.
For primary bibliographic entry see Field 13H.
PB-177 918 HC$3.00 MF$0.65

13E. Couplings, Fittings, Fasteners, and Joints

STUDY OF MICROMECHANICAL PROPERTIES OF ADHESIVE BONDED JOINTS.
Quarterly progress rept. no. 3, 1 Jan-31 Mar 68,
General Precision Systems Inc Little Falls N J Aerospace Research Center
Edward J. Hughes, and John L. Rutherford. 15 Apr 68, 25p
Contract DAAA21-67-C-0500
See also Quarterly Progress Report no. 2, AD-664 170.

Descriptors: (*Bonded joints, Mechanical properties), (*Adhesives, Bonded joints), Modulus of elasticity, Microstructure, Deformation, Thickness, Curing agents, Temperature, Tensile properties, Compressive properties, Fracture (Mechanics), Shear stresses, Loading (Mechanics), Strain (Mechanics), Extensometers, Epoxy plastics, Viscoelasticity, Aluminum, Stainless steel.
Identifiers: Fillers, Graphs (Charts).

Contents: Temperature dependence of effective tensile modulus; Pre-strain dependence of effective tensile modulus; Cross head speed dependence of secant modulus; Precision elastic limit; and Temperature dependence of shear modulus.
AD-668 245 HC$3.00 MF$0.65

FASTENING OF WOOD-PLASTIC COMBINATIONS.
Topical rept.,
West Virginia Univ., Morgantown. Engineering Experiment Station.
Wesley E. Loos, and James A. Kent. 1 Sep 67, 39p
Contract AT (40-1)-2945

Descriptors: (*Composite materials, *Joining), Wood, Plastics, Laminates, Adhesives, Mechanical fasteners.
Identifiers: Wood-plastic composites.

For abstract, see NSA 22 08.
ORO-2945-9 HC$3.00 MF$0.65

13F. Ground Transportation Equipment

FIBERGLASS STRENGTH MEMBER PROCUREMENT SPECIFICATION,
Boeing Co., Seattle, Wash.
J. N. Brion. 23 Aug 65, 20p D2-20140-1
Contract N123 (953)33813A

Descriptors: (*Towing cables, Specifications), (*Glass textiles, Towing cables), Epoxy plastics, Laminated plastics, Composite materials, Tensile properties, Compressive properties, Towed bodies, Underwater, Mechanical drawings.

The fiberglass tensile strength member described by this specification will connect a body submerged to a depth as deep as 400 feet in the sea to a fast moving surface vehicle. Use of a fiberglass strength member having a high strength per unit cross section in conjunction with an efficient, streamlined fairing (to reduce hydro-dynamic drag as well as contain an electrical conductor) results in lower overall drag than attainable with existing metal cables and associated fairings. (Author)
AD-443 393 HC$3.00

MOBILITY FOR COUNTERINSURGENCY WARFARE IN THAILAND,
Military Research and Development Center Bangkok (Thailand)
For primary bibliographic entry see Field 15G.
AD-667 927 HC$3.00 MF$0.65

A FEASIBILITY STUDY OF A REMOTE AREA LAND TRANSPORTATION CONCEPT.
Task rept.,
Battelle Memorial Inst., Columbus, Ohio. Remote Area Conflict Information Center.
M. M. De Long, and D. N. Goss. 16 Mar 67, 61p RACIC-TR-59
Contract F33657-67-C-0810, ARPA Order-935

Descriptors: (*Roads, *Tropical regions), (*Vehicles, *Feasibility studies), Terrain, Climatology, Trafficability, Economics, Thailand, Transportation, Compatibility, Traffic, Volume, Construction, Maintenance, Costs, Cargo vehicles, Passenger vehicles, Amphibious vehicles.
Identifiers: Agile project, ROTE vehicle (Rolligon Bag or Terra-tire equipped).

This report is a feasibility study of a remote area land transportation concept consisting of a vehicle-roadway combination. The concept description includes a discussion of the ROTE vehicles and of the required capacity and construction operations for minimal roads. The preliminary assessment of the concept's feasibility includes discussions of costs for (1) Road construction and maintenance, (2) Three examples, and (3) Vehicle operation, and discussion of potential usefulness of the concept for (1) Law-enforcement agencies, (2) Passenger transportation, and (3) Freight hauling. There is a comparison of minimal- and conventional-road investment and return. (Author)
AD-815 392 HC$3.00 MF$0.65

POLICE TRAFFIC SERVICES AND ROAD SAFETY: AN EVALUATION OF THE LITERATURE.
Travelers Research Center, Inc., Hartford, Conn.
For primary bibliographic entry see Field 13L.
PB-177 863 HC$3.00 MF$0.65

BRAKING PERFORMANCE OF CARS WITH DIFFERENT BRAKE AND WEIGHT DISTRIBUTIONS,
Road Research Lab., Crowthorne (England).
A. L. Alexander. 1967, 25p RRL-LR130

Descriptors: (*Brakes, Performance (Engineering)), Design, Hydraulic systems, Hydraulic brakes, Stability, Passenger vehicles, Reports, Great Britain.

This report describes some braking tests on a car having three alternative ratios of front to rear braking and on three other cars having different ratios of braking to weight distributions. Braking distances and decelerations were measured and the stability and the incidence of wheel locking were noted. Most tests were carried out by attempting to brake as heavily as possible without locking the wheels. A few locked wheel braking tests were carried out for comparison.
PB-177 903 HC$3.00 MF$0.65

STUDY OF SCHOOL BUS SAFETY.
National Commission on Safety Education, Washington, D. C.
For primary bibliographic entry see Field 13L.
PB-177 905 HC$3.00 MF$0.65

OCCUPANT PROTECTION IN VEHICLE INTERIOR RECOMMENDED PROGRAMS.
Cornell Aeronautical Lab., Inc., Buffalo, N. Y.
For primary bibliographic entry see Field 13L.
PB-177 906 HC$3.00 MF$0.65

AUTOMOBILE BODY CORROSION PREVENTION. MAINTENANCE AND REPAIR PROCEDURE.
International Cooperation Administration, Washington, D. C. Technical Aids Branch.
Jul 60, 29p

Descriptors: (*Passenger vehicles, Corrosion inhibition), (*Cargo vehicles, Corrosion inhibition), Maintenance, Finishes + finishing, Epoxy plastics, Polyester plastics, Filling, Lead alloys, Specifications.

Contents: Introduction; Automobile body coatings; Failures of coatings and corrosion; Primary maintenance recommendations; Maintenance procedures; Suppliers; Tools and equipment used for repairs to metal automobile bodies; Bibliography of government specifications; Conclusion.
PB-177 914 HC$3.00 MF$0.65

A STUDY OF METHODS FOR FORECASTING EMPLOYMENT,
Illinois Univ., Urbana. Inst. of Labor and Industrial Relations.
For primary bibliographic entry see Field 5C.
PB-178 008 HC$3.00 MF$0.65

A STUDY OF THE ADAPTABILITY OF THE AUTOMOBILE TO AUTOMATIC CONTROL,
Ohio State Univ., Columbus. Engineering Experiment Station.
Lyle Marvin Blackwell. Feb 67. 185p EES-276A-3
Prepared in cooperation with Bureau of Public Roads, Washington, D. C.

Descriptors: (*Passenger vehicles, Control systems), (*Control systems, *Automata), Design, Experimental design, Servomechanisms, Feedback, Signals, Momentum, Response, Inertia, Torque, Dynamometers, Mathematics, Numerical methods and procedures, Linear programming, Transfer functions, Differential equations, Asymtotic series, Phase studies, Man-machine systems.
Identifiers: Headway feedback.

Investigation of highway traffic flow has indicated that high speed flow occurs usually under conditions of low traffic density and that, conversely, high density traffic leads to low speed flow. The improvement of traffic flow, achieving simultaneously both high speed and high density flow has been under investigation by several groups throughout the nation. Recently there has been considerable concern about the incidence of traffic accidents and the rather alarming number of highway casualties. The Communication and Control Systems Laboratory has investigated the traffic flow problem in considerable depth and has suggested a two-fold approach to the traffic flow problem which has the agreeable prospect of not only increasing the efficiency of traffic flow, but also of possibly offering considerable gains toward reducing traffic accidents. This two-fold approach has been, first, investigating the feasibility of automating individual vehicles and second, providing an improved man-machine interface to yield better performance from a human driver when manually controlling an automobile. This improved interface can be used either by itself, or more ideally, as an adjunct to an automatically controlled vehicle.
PB-178 056 HC$3.00 MF$0.65

13G. Hydraulic and Pneumatic Equipment

FLUIDIC STALL SENSING SYSTEM,
Harry Diamond Labs Washington D C
For primary bibliographic entry see Field 1C.
AD-667 936 HC$3.00 MF$0.65

INVESTIGATION OF LOW-CAPACITY HIGH-PRESSURE STAGES OF CENTRIFUGAL COMPRESSORS,
Foreign Technology Div Wright-Patterson AFB Ohio
S. A. Anisimov, Yu. B. Galerkin, and F. S. Rekstin. 13 Sep 67, 26p Rept no. FTD-MT-24-174-67
Edited machine trans. of Politekhnicheskii Institut, Leningrad, Trudy (USSR) n228 p63-78 1963.

Descriptors: (*Centrifugal compressors, Efficiency), Impellers, Pressure, Diffusers, Performance (Engineering), Design, Stagnation point, Hydraulic systems, Drag, Mach number, Reynolds number, USSR.
Identifiers: Translations.

In view of the importance to contemporary turbocompressor design of increasing the efficiency of low-capacity, high-pressure, centrifugal compressors, and the difficulties engendered by the small discharge volumes, the paper summarizes and evaluates the results obtained in tests of such compressor stages. Tests were carried out on 9 configurations of intermediate stages (impeller-diffuser-return bend and channel) and 3 configurations of terminal stages (impeller-diffuser). All the impellers had a relative width b2/D2 of approximately 0.02; the intermediate stage impellers had a diameter D2 of 352 mm and were tested at tip speeds of 300-315 m/sec., while the terminal stage impellers were 220-256 mm in diameter and were tested at 196-229 m/sec. Three types of diffusers (channeled, vaned and vaneless) were used for the intermediate stages, while the terminal stages were tested only with vaned diffusers. The effectiveness of a particular stage was evaluated on the basis of the stage efficiency, impeller efficiency, diffuser efficiency, stage pressure coefficient, stage pressure ratio, impeller pressure ratio, drag coefficient of the stationary parts, relative loss coefficient of the stagnation pressure, degree of reaction, Mach number, Reynolds number, flow coefficient, discharge rate and the angles of incidence of flow. (Author)
AD-668 066 HC$3.00 MF$0.65

DESIGN OF RUNNER BLADES OF FRANCIS TURBINE BY BAUERSFELD METHOD.
National Science Foundation, Washington, D. C. Special Foreign Currency Science Information Program.
For primary bibliographic entry see Field 10A.
TT-67-59002 HC$3.00 MF$0.65

13H. Industrial Processes

EFFECTS OF ULTRASONIC VIBRATIONS ON TRANSISTORS IN SUBASSEMBLIES.
Army Electronics Command Fort Monmouth N J
For primary bibliographic entry see Field 9E.
AD-667 973 Not available from CFSTI.

EXPLOSIVE WELDING (CLADDING) OF HIGH TEMPERATURE METALS TO HIGH STRENGTH STEELS: FIRST PHASE REPORT.
Technical memo.,
Naval Weapons Lab Dahlgren Va
R. William Breitzig. 25 Jul 65, 25p Rept no. NWL-TM-T-27/65

Descriptors: (*Cladding, Explosive forming), (*Steel, Cladding), Heat-resistant metals + alloys, Nickel alloys, Cobalt alloys, Chromium alloys, Iron alloys, Tantalum alloys, Tungsten alloys, Molybdenum alloys, Titanium alloys, Zirconium alloys, Niobium, Surface properties, Sheets.
Identifiers: Steel 6434, Inconel (Alloys), Molybdenum TZM, Tantalum alloy 10W.

AMS 6434 steel can be clad with columbium, molybdenum, tantalum/tungsten (90/10), and high nickel alloys by explosive welding when the steel surface to be welded has been knurled beforehand. (Author)
AD-668 021 HC$3.00 MF$0.65

ROLLING OF METAL POWDERS,
Foreign Technology Div Wright-Patterson AFB Ohio
For primary bibliographic entry see Field 11F.
AD-668 029 HC$3.00 MF$0.65

FORGE ROLLING OF BILLETS IN TWO PASSES ON ROLLS WITH CHAIN PUSHER,
Foreign Technology Div Wright-Patterson AFB Ohio
G. P. Savin. 13 Sep 67, 12p Rept no. FTD-MT-24-191-67
Edited machine trans. of Kuznechno-Shtampovochnoe Proizvodstvo (USSR), n1 p3-7 1966.

Descriptors: (*Rolling (Metallurgy), *Forging), Rolling mills, Castings, USSR.
Identifiers: Translations.

The article discusses and describes forge rolling of billets in two passes on rolls with chain pusher. Operations of two-, three-, and multistand rolls are described and compared. Deficiencies encountered during operation of rolls are discussed along with means of their removal. There are figures of rollers and graphs for illustration.
AD-668 054 HC$3.00 MF$0.65

THE EFFECT OF TRANSMITTING MEDIA ON THE FORMING OF SHEET METALS IN EXPLOSIVE FORMING,
Foreign Technology Div Wright-Patterson AFB Ohio
E. B. Medzyanovskii. 30 Jun 67, 14p Rept no. FTD-HT-67-8
Edited trans. of Kuznechno-Shtampovochnoe Proizvodstvo (USSR) n4 p25-8 1965.

Descriptors: (*Explosive forming, Aluminum alloys), Sheets, Deformation, Shock waves, Water, Sand, Rubber, Performance (Engineering), Wave transmission, USSR.
Identifiers: Translations.

AMg6M aluminum-base alloy sheets 2 mm thick were subjected to explosive forming using water, sand, and rubber as transmitting media in a spherical die 120 mm in diameter. To determine the effect of shock waves reflected from container walls, forming was done in a permanent container, a thick-walled cylinder, and in single-shot polyethylene or resin-impregnated glass cloth containers. By varying the weight of the explosive charge, the specimens were deformed until cracks appeared. It was found that forming with sand required an explosive charge 4.5-5.0 times larger than forming with water for a cavity of the same size. The distribution of the maximum deformation and maximum curvature and the nature and location of ruptures along the profile of the deformed blanks were appreciably different in forming with water, sand, and rubber. (Author)
AD-668 065 HC$3.00 MF$0.65

MACHINE BUILDING: CHAPTER IV,
Foreign Technology Div Wright-Patterson AFB Ohio
V. P. Romanovskii. 14 Sep 67, 48p Rept no. FTD-MT-67-09
Edited machine trans. of mono. Mashinostroenie, Moscow, 1965 p305-37.

Descriptors: (*Material forming, USSR), Machining, Explosive forming, Configuration, Sheets, Stretch forming, Drawing (Machine processing), Extrusion, Structural parts, Deformation, Flanges, Dies, Cylindrical bodies, Mechanical working, Hydroforming (Mechanical), Magnetohydrodynamics.
Identifiers: Translations, Metal stamping, Relief forming, Upsetting (Material forming), Holes (Cavities), Ironing (Metallurgy), Squeeze forming.

This report on machine building is devoted to basic information on the topic of sheet forming. Subheadings include: (1) relief forming; (2) flanging of holes and external contour; (3) high power forming; (4) stretching (hollow upsetting); (5) squeezing; (6) straightening. Typical examples are given in each category and basic techniques are described. (Author)
AD-668 231 HC$3.00 MF$0.65

AVIATION TECHNOLOGICAL INSTITUTE. TRANSACTIONS: NO. 58, 1963,
Foreign Technology Div Wright-Patterson AFB Ohio
For primary bibliographic entry see Field 1C.
AD-668 233 HC$3.00 MF$0.65

QUARTERLY REPORT OF TECHNICAL PROGRESS (11TH),
Martin Marietta Corp Denver Colo Center for High Energy Forming
J. D. Mote. 1 Apr 68, 31p
AMRA-CR-66-05/13
Contract DA-19-066-AMC-266 (X)

Descriptors: (*High energy rate forming, Reports), Metallurgy, Explosive forming, Aluminum, Strain gages, Deformation, Stability, Strain (Mechanics), Correlation techniques, Foils, Molybdenum, Welding, Numerical methods and procedures, Energy, Structural properties.
Identifiers: Graphs (Charts), Hydrostatic bulge tests, Electromagnetic forming, Explosive welding.

Strain gage data showing strain- and pressure-time histories versus charge stand-off during explosive deformation is given. The results show a decrease in strain rate with an increase in stand-off at constant charge weight. Recent results of a numerical solution for deformation and instability in the hydrostatic bulge test are presented. Summary information is presented for technology transfer; mechanics of energy transfer and high velocity metal deformation; electromagnetic forming; strain rate effects; the effect of explosive forming on the terminal properties of materials, and explosive welding. (Author)
AD-668 243 HC$3.00 MF$0.65

DEVELOPMENT OF PRACTICE FOR COMPOSITE ROLLING OF STRUCTURAL METAL PANELS.
Quarterly rept. no. 7, 15 Nov 67-15 Feb 68,
Battelle Memorial Inst Columbus Ohio Columbus Labs
J. R. Van Orsdel, D. N. Williams, and E. S. Bartlett. Apr 68, 15p
AMMRC-CR-66-02/7
Contract DA-19-066-AMC-308 (X)
See also AD-666 751.

Descriptors: (*Panels (Structural), Rolling (Metallurgy)), (*Composite materials, *Rolling (Metallurgy)), (*Diffusion bonding, Panels (Structural)), Laminates, Metals, Titanium alloys, Beryllium alloys, Welding, Nickel alloys, Temperature, Sheets, Vacuum, Cracks, Manufacturing methods, Chromium alloys, Cobalt alloys, Aluminum alloys, Molybdenum alloys, Iron alloys, Carbon alloys, Niobium alloys.
Identifiers: Rene 41 (Alloy), Inconel (Alloys).

Continued roll-bonding experiments with the nickel-base alloy Rene 41 are described. Variables studied included rolling temperature, reduction per pass, and cleaning procedures including vacuum outgassing at high temperature. Metallographic examinations of the beryllium stiffener fabricated into the skin sheet of the B120VCA titanium alloy during the last quarter showed the beryllium to be badly cracked. Fabrication of composite-filler bars for pilot-size pack lay-ups was completed.
AD-668 244 HC$3.00 MF$0.65

THE USE OF NUMERICALLY CONTROLLED MACHINE TOOLS IN R.A.E. WORKSHOPS.
Technical rept.,
Royal Aircraft Establishment Farnborough (England)
S. W. Potter. Dec 66, 48p Rept no. RAE-TR-66408

Descriptors: (*Airplane models, Manufacturing methods), (*Machining, *Control systems), Automatic, Machine tools, Reviews, Costs, Magnetic tape, Punched cards, Wind tunnel models, Programming (Computers), Computer personnel, Quality control, Maintenance, Machine shop practice, Great Britain.
Identifiers: *Numerical controls.

The report is an account of the introduction and use of numerically-controlled machine tools in the Workshops Department of R.A.E. up to December 1966 with examples, in the form of appendices, of work carried out on each of the machines. These examples cover the field of two-dimensional position control, two-dimensional continuous control and the more sophisticated three-dimensional contoured shapes with initial use being concentrated on manufacture and measurement of aerodynamic models and their associated equipment for testing in the Establishment's various Wind Tunnels. Advantages from this form of control have subsequently led to the further use of numerically controlled machines for more orthodox engineering manufacture. These advantages in outweighing the disadvantages make it inevitable that N.C. will progressively replace to a larger extent the manually operated machines albeit by a fewer number. The logical trend of N.C. making possible a reduction in the amount of inspection of components is mentioned with examples of where this has already happened. The impact of N.C. on Staff and Maintenance of Machine Tools is also recorded. (Author)
AD-668 352 HC$3.00 MF$0.65

CONTEMPORARY STATE OF THE PRODUCTION OF BENT PROFILES IN THE USSR AND ABROAD,
Foreign Technology Div Wright-Patterson AFB Ohio
I. S. Trishevskii, G. B. Donets, and Yu. V. Dzina. 9 Jun 67, 22p Rept no. FTD-MT-67-14
Edited machine trans. of mono. Vysokoekonomichnye Gnutye Profili Prokata, n.p., 1965 p7-20.

Descriptors: (*Machining, State-of-the-art reviews), Rolling (Metallurgy), Rolling mills, Steel industry, Industrial plants, USSR.
Identifiers: Translations.

This article is essentially in two parts, in the first of which the authors discuss the present state of the art in the production of bent sections in countries other than the Soviet Union (United States, France, West German, Austria, Czechoslovakia). The second part of the paper deals with the status of bent-section milling in the SSSR. The presentation of information is in the form of a listing of different plants with a brief description of the type (or types) of mill available and the nature of the work performed. A table is also included, illustrating the basic technical specifications of the section-bending mills presently in use in the SSSR. This table covers such points as the site of the mill, the dimensions (thickness and width) of the blanks, working diameter of the rolls, number of stands, profiling speed, engine power (in horsepower) and productivity (in meters per hour). (Author)
AD-668 506 HC$3.00 MF$0.65

MACHINE BUILDING (SECTION 43 AND 44),
Foreign Technology Div Wright-Patterson AFB Ohio
V. P. Romanovskii. 18 Sep 67, 22p Rept no. FTD-MT-67-55
Edited machine trans. of mono. Mashinostroenie, Moscow, 1965 p393-402.

Descriptors: (*Mechanical working, Reviews), Bending, Press forging, Machine tools, Rolling (Metallurgy), USSR.
Identifiers: Translations.

Section 43 of the article briefly reviews four basic methods of bending shaped blanks and cites examples of appropriate use of each method. Section 44, entitled 'Press Works' briefly categorizes operations which are included under this title. Such operations include: (1) pressing on press lathes; (2) press-rolling on rolling lathes; (3) crimping, flanging, and edgecutting on special vertical two-spindle crimping machines. (Author)
AD-668 512 HC$3.00 MF$0.65

ON INCREASE OF SPEED OPERATION OF CERTAIN SYSTEMS OF AUTOMATIC CONTROL,
Foreign Technology Div Wright-Patterson AFB Ohio
N. Kh. Shatskii. 14 Jul 67, 20p Rept no. FTD-MT-67-59
Edited machine trans. of Izvestiya Vysshikh Uchebnykh Zavedenii. Elektromekhanika (USSR) n7 p783-90 1965.

Descriptors: (*Control systems, Automatic), (*Optimization, Control systems), Mathematical models, Systems engineering, Transients, Feedback, Electric motors, USSR.
Identifiers: Translations, Automatic control systems, Optimum control theory.

Optimal transients are considered in automatic systems where the principal control signal depends on the deviation of the controlled variable from its set value. The optimal transient process consists of acceleration and deceleration, both having a constant maximum value. The angular velocity linearly depends on time. The shortest transient process requires the functioning of a negative feedback and a time-proportional positive feedback. The second derivative of speed is selected as a control input that can ensure the speed-time linear relation. A negative feedback proportional to the error-signal first derivative is suggested for changing the sign of the control input. Restricting the error signal is proposed to ensure minimum duration of the control process for different initial errors (deviations). The above ideas are illustrated by an example of an automatic vector-measuring device. Shapes of control-signal curves are shown and explained.
AD-668 513 HC$3.00 MF$0.65

ADHESIVE BONDING OF STAINLESS STEELS INCLUDING PRECIPITATION-HARDENING STAINLESS STEELS.
National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
R. E. Keith, R. C. Martin, and M. D. Randall.
1966, 125p NASA-SP-5085, RSIC-599
Contract DA-01-021-AMC-11651/Z/
Prep- Prepared By Battelle Memorial Inst.

Descriptors: *Adhesives, *Metal-metal bonding, *Stainless steels, Adhesion tests, Joints (junctions), Metal surfaces, Precipitation hardening, Surface properties.

For abstract, see STAR 06 10.
N68-20056 HC$3.00 MF$0.65

THERMAL AND MECHANICAL TREATMENT FOR PRECIPITATION-HARDENING STAINLESS STEELS.
National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
A. M. Hall, A. F. Hoenie, and C. J. Slunder. 1967, 207p NASA-SP-5089, RSIC-600
Contract NASA ORDER H-76715, DA-01-021-AMC-11651/Z/
Spon- Sponsored Jointly With Aec Prep- Prepared By Battelle Mem. Inst. for Redstone Sci. Inform. Center

Descriptors: *Austenitic stainless steels, *Fabrication, *Heat treatment, *Martensitic stainless steels, *Precipitation hardening, Chemical composition, Cold working, Hot working, Metallurgy, Missile structures.

For abstract, see STAR 06 10.
N68-20433 HC$3.00 MF$0.65

AUTOMOBILE BODY CORROSION PREVENTION. MAINTENANCE AND REPAIR PROCEDURE.
International Cooperation Administration, Washington, D. C. Technical Aids Branch.
For primary bibliographic entry see Field 13F.
PB-177 914 HC$3.00 MF$0.65

MEN'S WORK SHIRTS. CAPITAL REQUIREMENTS, TECHNIQUES AND OPERATIONS.
International Cooperation Administration, Washington, D. C. Technical Aids Branch.
1961, 76p
Prepared in cooperation with Wolf Management Engineering Co., Chicago, Ill. A Reference for use in Planning New Industrial Facilities.

Descriptors: (*Clothing, *Industrial production), Costs, Industrial plants, Quality control, Management engineering, Standards, Manpower, Manufacturing methods, Employment, Production control, Industrial equipment.

The report is concerned with the inexpensive work shirt. Being a staple item of clothing and sold in great volume under highly competitive conditions, it must necessarily be produced efficiently, using the best methods and equipment, if the enterprise is to be successful. Fortunately, the processes are well defined and comparatively simple, and the machinery required is readily available at reasonable cost. The basic information and factual data required for consideration before engaging in the business are presented. (Author)
PB-177 915 HC$3.00 MF$0.65

PLANT REQUIREMENTS FOR MANUFACTURE OF BUCKETS, PAILS AND PANS.
Revised ed.
International Cooperation Administration, Washington, D. C. Technical Aids Branch.
May 59, 38p
Prepared in cooperation with Andrews (George H.) Engineering Associates, Inc., Washington, D. C.

Descriptors: (*Containers, Industrial production), Kitchen equipment + supplies, Manufacturing methods, Industrial plants, Costs, Zinc coatings, Corrosion inhibition, Tin coatings, Costs, Labor, Industrial equipment, Personnel, Training.

Galvanizing is a process by which iron or steel is coated with zinc to render it rust-resistant. There are three general methods for accomplishing this. They are, (1) the hot - dip method; (2) the electrogalvanizing method; and (3) the 'Sherardizing' method. This manual describes the hot-dip method because it is the most widely used and because of its economic advantages over the other methods. The tinplating process is accomplished by the same basic method. The galvanizing process is used in the manufacture of buckets, pails, wash tubs, water tanks and many industrial products. It cannot be used in any product which comes in contact with food, however, because the zinc will contaminate the food. Tinplated products, on the other hand, are used extensively for food containers. There is very little tinplating done by the hot-dip method in the United States due to the high cost of tin. In fact, many manufacturers are using aluminum, stainless steel, and copper for cooking utensils instead of tinplate. In other parts of the world, however, tin would probably be cheaper than other applicable materials. (Author)
PB-177 918 HC$3.00 MF$0.65

PLANT REQUIREMENTS FOR MANUFACTURE OF CERAMIC DINNERWARE.
Revised ed.
International Cooperation Administration, Washington, D. C. Technical Aids Branch.
May 59, 41p
Prepared in cooperation with Andrews (George H.) Engineering Associates, Inc., Washington, D. C.

Descriptors: (*Kitchen equipment + supplies, Industrial production), Ceramic materials, Industrial plants, Industrial equipment, Manufacturing methods, Costs, Labor, Commerce, Standards, Personnel, Training, Safety.
Identifiers: Dinnerware.

Dinnerware production in the United States ranges from very high production from highly mechanized factories to very small potteries which produce in small quantities. The smaller potteries generally depend on the unusual in design in marketing their ware, while the larger potteries rely heavily on competitive pricing. The products of the plant discussed in this report are those comprising a line of relatively heavy, serviceable, semi-vitreous dinnerware. A representative assortment of products consists of cups, saucers, 6-inch and 10-inch plates, salad bowls, and large serving bowls. (Author)
PB-177 919 HC$3.00 MF$0.65

PLANT REQUIREMENTS TO SET UP AND OPERATE A GRAY IRON JOBBING FOUNDRY.
Revised ed.
Agency for International Development, Washington, D. C. Communication Resources Div.
Apr 59, 40p
Prepared in cooperation with Andrews (George H.) Engineering Associates, Inc., Washington, D. C.

Descriptors: (*Casting, *Iron industry), Iron, Molding, Melting, Cleaning, Costs, Industrial plants, Industrial equipment, Labor, Safety.

The manual is predicated on establishing a small gray iron foundry doing a general or jobbing business, and turning out a production of about 8 tons a day of finished castings. This production level was selected because it represents a small, yet economical unit, employing 30 to 35 men. (Author)
PB-177 920 HC$3.00 MF$0.65

PLANT REQUIREMENTS FOR MANUFACTURE OF MEN'S SOCKS.
Revised ed.
International Cooperation Administration, Washington, D. C. Technical Aids Branch.
May 59, 33p
Prepared in cooperation with Andrews (George H.) Engineering Associates, Inc., Washington, D. C.

Descriptors: (*Socks, *Industrial production), Industrial plants, Costs, Labor, Industrial equipment, Dyes, Budgets, Manufacturing methods, Training, Personnel.

The purpose of this manual is to present basic information for establishing and operating a small plant for the manufacture of men's socks. Except for a small percentage all socks are made by the knitting process. There are about 4,000 knitting industries in the United States. A few of the products made in these industries include outerwear, underwear and hosiery. However, this manual will be devoted exclusively to men's socks. The term sock used in this manual denotes a short stocking as distinguished from a hose that is longer. (Author)
PB-177 921 HC$3.00 MF$0.65

PLANT REQUIREMENTS TO SET UP AND OPERATE A PLASTIC MOLDING PLANT.
Revised ed.
Agency for International Development, Washington, D. C. Communications Resources Div.
Apr 59, 49p
Prepared in cooperation with Andrews (George H.) Engineering Associates, Inc., Washington, D. C.

Descriptors: (*Plastics, *Industrial production), Plastics industry, Industrial plants, Industrial equipment, Manufacturing methods, Molding, Dies, Labor, Costs.

It is assumed, for this prospectus, that the market for the products of any plastic molding plant which might be established will be primarily non-industrial. It is also assumed that a hypothetical plan, if sound from the point of view of both economics and technical considerations, would be helpful. Accordingly, such a plan with the capital require-

ments limited to approximately $240,000 is presented. (Author)
PB-177 922 HC$3.00 MF$0.65

PLANT REQUIREMENTS FOR MANUFACTURE OF SANITARY WARE.
Revised ed.
International Cooperation Administration, Washington, D. C. Technical Aids Branch.
May 59, 39p
Prepared jn cooperation with Andrews (Geprge H.) Associates, Inc., Washington, D. C.

Descriptors: (*Toilet facilities, *Industrial production), Ceramic coatings, Industrial equipment, Industrial plants, Manufacturing methods, Iron, Castings, Costs, Labor, Standards.

The process of enameling cast iron sanitary ware imparts a hard, glossy surface to the object. This coating permits easy cleaning and presents a pleasing appearance. It is stain resistant, highly acid resistant, and, if properly applied and given reasonable care in usage, will last almost indefinitely. The type of plant described in this report is one which could be set up in almost any part of the world. The basic raw materials -- pig iron, scrap iron, and sand -- are ordinarily obtainable in all parts of the world. Where special skills would be required for the production of the ware, modern machinery has been substituted wherever feasible. In this way, the operation can be started more readily and quality standards can be reached sooner. (Author)
PB-177 923 HC$3.00 MF$0.65

PLANT REQUIREMENTS FOR MANUFACTURE OF TERRY CLOTH.
Revised ed.
International Cooperation Administration, Washington, D. C. Technical Aids Branch.
May 59, 37p
Prepared in cooperation with Andrews (George H.) Associates, Inc., Washington, D. C.

Descriptors: (*Textiles, *Industrial production), Labor, Costs, Industrial equipment, Industrial plants, Manufacturing methods, Cotton.
Identifiers: *Terry cloth.

Terry cloth is cotton fabric covered with loops on one or both sides. It requires two sets of warps and one set of filling; one set of warp threads is held taut while weaving, the other set is released to form the loops. When woven in linen (rare) or bleached cotton in narrow widths, terry cloth is called 'Turkish toweling.' This usually has two loops (called double-loop terry). It can also be made in checks, stripes, or plaid, or bleached and dyed. Uses include towels, wash cloths, robes, bath mats, bathing suits or sunsuits, linings for suits and coats, draperies, spreads, bedrolls, and potholders. Terry cloth readily absorbs and retains moisture, making it suitable for use as wash cloths and toweling. It is used in some applications because of its efficiency as an insulating medium and because it is readily washed when soiled. Due to the fact that the applications of single-loop terry cloth are numerous and in good volume, the discussion is concerned with the production of cloth of that type in a mill of minimum economic size. (Author)
PB-177 924 HC$3.00 MF$0.65

PLANT REQUIREMENTS FOR MANUFACTURE OF WOOD TABLES AND CHAIRS.
Revised ed.
International Cooperation Administration, Washington, D. C. Technical Aids Branch.
May 59, 46p
Prepared in cooperation with Andrews (George H.) Associates, Inc., Washington, D. C.

Descriptors: (*Kitchen equipment + supplies, *Industrial production), Wood, Manufacturing methods, Industrial plants, Industrial equipment, Costs, Labor.
Identifiers: Tables and chairs.

The purpose of this manual is to provide information for the establishment and operation of a small plant to manufacture low cost wooden tables and chairs. The table and chairs shown in this manual are designed for low cost production and are not intended for the luxury market. Local customs might require some change in the designs. However, design changes that will add substantially to the cost of the product should be avoided. (Author)
PB-177 925 HC$3.00 MF$0.65

PLANT REQUIREMENTS TO SET UP AND OPERATE A MEAT PROCESSING PLANT.
International Cooperation Administration, Washington, D. C. Technical Aids Branch.
For primary bibliographic entry see Field 6H.
PB-177 926 HC$3.00 MF$0.65

PLANT REQUIREMENTS FOR MANUFACTURE OF WORSTED YARNS.
International Cooperation Administration, Washington, D. C.
Sep 61, 35p
Prepared in cooperation with Andrews (George H.) Engineering Associates, Inc., Washington, D. C.

Descriptors: (*Fibers, Industrial production), Manufacturing methods, Industrial plants, Industrial equipment, Costs, Labor, Training.
PB-177 927 HC$3.00 MF$0.65

PLANT REQUIREMENTS TO SET UP AND OPERATE A DRY CLEANING PLANT.
International Cooperation Administration, Washington, D. C. Technical Aids Branch.
Sep 57, 47p
Prepared in cooperation with Andrews (George H.) Engineering Associates, Inc., Washington, D. C.

Descriptors: (*Industrial plants, *Cleaning), Textiles, Cleaning compounds, Solvents, Industrial equipment, Costs, Driers (Apparatus), Presses (Machinery), Packaging, Safety.
Identifiers: Dry cleaning.

The small dry cleaning plant described in this brochure is intended to clean and finish all types of clothing, bedding, draperies and many other kinds of household textile articles. Dry cleaning textile articles generally is done by washing them in petroleum solvent, such as benzine, or in synthetic solvent, such as perchlorethylene. The equipment for one of these processes cannot be used for the other process. The dry cleaning process carried out in a synthetic-solvent plant using perchlorethylene is described in this brochure. (Author)
PB-177 928 HC$3.00 MF$0.65

PLANT REQUIREMENTS FOR MANUFACTURE OF FLUSH DOORS.
International Cooperation Administration, Washington, D. C. Technical Aids Branch.
Sep 67, 34p
Prepared in cooperation with Andrews (George H.) Engineering Associates, Inc., Washington, D. C.

Descriptors: (*Doors, *Industrial production), Wood, Manufacturing methods, Industrial plants, Industrial equipment, Specifications, Labor, Costs.

The equipment and operating procedures described in this brochure are intended for the production of flush doors as an addition to, or the expansion of, an existing woodworking plant, where there is sufficient demand for these products and where such a local operation would be practicable. The equipment and methods shown in this brochure are modern and capable of making all grades of flush doors, both interior and exterior, up to 3 feet wide and 7 feet long. (Author)
PB-177 929 HC$3.00 MF$0.65

PLANT REQUIREMENTS FOR MANUFACTURE OF PLYWOOD.
International Cooperation Administration, Washington, D. C. Technical Aids Branch.
Sep 57, 45p
Prepared in cooperation with Andrews (George H) Engineering Associates, Inc., Washington, D.C.

Descriptors: (*Plywood, *Industrial production), Manufacturing methods, Industrial plants, Industrial equipment, Storage, Handling, Wood, Processing, Labor, Costs.

The small plywood plant described in this brochure is intended to manufacture plywood panels in a foreign country, where there is sufficient demand for these products and where such a local operation would be practicable. The machinery, equipment and methods shown in this brochure are modern and capable of making all grades of veneer and plywood, including marine plywood. The plant will operate equally well with either hard or soft wood. (Author)
PB-177 930 HC$3.00 MF$0.65

PLANT REQUIREMENTS FOR MANUFACTURE OF PORCELAIN ENAMELWARE.
International Cooperation Administration, Washington, D. C. Technical Aids Branch.
Apr 56, 20p
Prepared in cooperation with Penniman and Browne, Baltimore, Md.

Descriptors: (*Kitchen equipment + supplies, *Industrial production), Cooking devices, Manufacturing methods, Processing, Industrial equipment, Industrial plants, Costs.

Contents: Manufacturing operations; Plant requirements; Suggested sources of supply for raw materials and processing equipment; Illustration; Supplementary data; Sources of information.
PB-177 931 HC$3.00 MF$0.65

PLANT REQUIREMENTS FOR MANUFACTURE OF ASBESTOS - CEMENT PIPE.
International Cooperation Administration, Washington, D. C. Technical Aids Branch.
Jun 60, 33p
Prepared in cooperation with Andrews (George H.) Engineering Associates, Inc., Washington, D. C.

Descriptors: (*Pipes, *Industrial production), Asbestos, Cements, Manufacturing methods, Industrial plants, Industrial equipment, Costs, Labor.

As indicated by the name, asbestos-cement pipe is made of asbestos fibre and Portland cement, usually in combination with some other material like silica. A curing agent may also be added but this is not always necessary. In the United States the market for asbestos-cement pipe is large and growing steadily. This favorable situation has grown from the fact that these products meet many of the needs for pipe with the physical characteristics of asbe tos-cement products. They are inexpensive and with unusual resistance to various corrosive fluids found in many pipe systems. Asbestos does not burn and is a very poor conductor of electricity. (Author)
PB-177 932 HC$3.00 MF$0.65

PLANT REQUIREMENTS FOR MANUFACTURE OF SOYBEAN OIL AND MEAL.
International Cooperation Administration, Washington, D. C. Technical Aids Branch.
Sep 61, 62p
Prepared in cooperation with Andrews (George H.) Engineering Associates, Inc., Washington, D. C.

Descriptors: (*Vegetable oils, Processing), Industrial plants, Industrial equipment, Phospholipids, Food, Glycerols, Acids, Yeasts, Colloids, Paints, Insecticides, Purification, Labor, Costs.
Identifiers: Soybeans.

Soya beans, which are native to eastern Asia, are now grown extensively in all parts of the world. They thrive best in the temperate zone. The uses for the end product are many, at latest count numbering some 150 separate applications. The principal uses of the expelled crude soya oil include seven basic categories: (1) Technical refined oils; (2) Edible refined oils; (3) Edible lecithin; (4) Technical lecithin; (5) Medicinal lecithin; (6) Glycerine; (7) Acids. (Author)
PB-177 933 HC$3.00 MF$0.65

PLANT REQUIREMENTS FOR MANUFACTURE OF CHALK WHITING.
International Cooperation Administration, Washington, D. C. Technical Aids Branch.
Sep 61, 36p
Prepared in cooperation with Andrews (George H.) Engineering Associates, Inc., Washington, D. C.

Descriptors: (*Mineral products, *Industrial production), Limestone, Material separation, Particle size, Manufacturing methods, Industrial plants, Industrial equipment, Labor, Costs.
Identifiers: Chalk whiting.

The report is primarily concerned with the absolute minimum operation for manufacture of true chalk whiting and, therefore, discusses the simplest manufacturing processes utilizing the crushing, grinding, and screening of high purity chalk. However, sources of raw material for the manufacture of true whiting are limited. This, and many other factors have led to the development of whiting substitutes with their alternate methods of manufacture and production. The CaCO3 chemical industry that has grown up in the United States in recent years is an outstanding example of such a development. Before presenting the detailed description of the manufacture of true chalk whiting, sufficient information on whiting substitutes is included to present a basic concept of methods for their production and to offer to present a basic concept of methods for their production and to offer sources of information for further study of operations that may be adaptable to any locale and its available raw materials. (Author)
PB-177 934 HC$3.00 MF$0.65

PLANT REQUIREMENTS FOR MANUFACTURE OF STRETCH SOCKS FOR MEN AND CHILDREN.
International Cooperation Administration, Washington, D. C. Technical Aids Branch.
Sep 61, 34p
Prepared in cooperation with Andrews (George H.) Associates, Inc., Washington, D. C.

Descriptors: (*Socks, *Industrial production), Manufacturing methods, Textile industry, Industrial plants, Industrial equipment, Dyes, Labor, Costs.

The purpose of this report is to present basic information for establishing a manufacturing plant in a foreign country to produce stretch socks for men and children. Such a manufacturing plant is generally known as a knitting mill. (Author)
PB-177 935 HC$3.00 MF$0.65

PLANT REQUIREMENTS FOR MANUFACTURE OF CEMENT.
Agency for International Development, Washington, D. C. Communications Resources Div.
Dec 61, 58p
Prepared in cooperation with Andrews (George H.) Engineering Associates, Inc., Washington, D. C.

Descriptors: (*Cements, *Industrial production), Manufacturing methods, Industrial plants, Industrial equipment, Processing, Construction materials, Production control, Labor, Costs.
PB-177 936 HC$3.00 MF$0.65

PLANT REQUIREMENTS FOR MANUFACTURE OF READY-MIXED CONCRETE.
Agency for International Development, Washington, D. C. Communications Resources Div.
Mar 62, 31p
Prepared in cooperation with Andrews (George H.) Engineering Associates, Inc., Washington, D. C.

Descriptors: (*Concrete, *Industrial production), Manufacturing methods, Industrial plants, Industrial equipment, Labor, Costs.

The purpose of this report is to present basic information for establishing a manufacturing plant in a foreign country to produce dry ready-mixed concrete in paper bags. Dry ready-mixed concrete is made of various mixtures of cement and aggregates and these mixtures are called by various names such as 'dry mix cement,' 'Ready mixed concrete' and 'ready mixed cement.' Some of the names used are trade names, such as 'homecrete' and 'sackcrete.' Some of these may include additives or admixtures that are intended to produce certain desirable qualities in the final product. For the purposes of this report the product is called ready-mixed concrete. This product is made up of cement, sand and gravel, without any special additives. This ready-mixed concrete is intended for use by homeowners and others who need only a small amount of concrete at any one time and who cannot, therefore, buy the cement, the sand and the gravel separately, to their advantage. The ready-mixed concrete is kept on hand in retail hardware stores, paint stores, lumber yards, and building supply places. Thus it always will be convenient for any homeowner or other possible user who may wish to purchase small quantities for immediate use. (Author)
PB-177 937 HC$3.00 MF$0.65

PLANT REQUIREMENTS FOR MANUFACTURE OF BROOMS.
Agency for International Development, Washington, D. C. Communications Resources Div.
May 57, 14p
Prepared in cooperation with Thompson and Williams, Washington, D. C.

Descriptors: (*Industrial production, Maintenance equipment), Costs, Buildings, Wages, Materials, Manpower, Quality control, Manufacturing methods, Industrial equipment, Industrial plants.
Identifiers: *Brooms.

The manufacture of brooms offers a profitable business opportunity adaptable to broad variation in initial investment required, locale, raw materials, labor requirements, climate, and market conditions. Existing buildings may in many cases be adapted to house a modern broom factory with little or no alteration. The principal requirements are adequate floor space, a source of power, and ventilation. Fireproof buildings are desirable especially for warehousing space since fire insurance rates in many locations are high for any operation involving combustible materials. (Author)
PB-177 938 HC$3.00 MF$0.65

PLANT REQUIREMENTS FOR MANUFACTURE OF MECHANICAL SPRINGS.
Revised ed.
Agency for International Development, Washington, D. C. Communications Resources Div.
Jul 62, 48p
Prepared in cooperation with Vitron Engineering Co., Washington, D. C.

Descriptors: (*Springs, *Industrial production), Manufacturing methods, Industrial plants, Industrial equipment, Production control, Specifications, Machining, Labor, Costs.

The purpose of this report is to present basic information relative to the establishment of a plant to manufacture mechanical springs in a foreign country. Springs may be produced in a wide variety of shape, such as coiled, spiral, flat, leaf, ring, and numerous special shapes. They may be of various types, depending upon their intended use, such as tension, compression, torsion, extension, cantilever, etc. The ends may be formed to most any shape desired, such as tightly coiled, looped, squared, hooked, open, etc. A plant may manufacture only stock type springs for general purpose use, or it may manufacture a wide variety of shapes, types, and sizes to a customer's individual specifications. The plant described herein has been planned and equipped to produce initially the six general groups of spring products listed under 'Product Specifications.' This production can be varied to suit local conditions. A plant of this type will require a substantial capital investment and a relatively skilled labor force. Obviously, an economically underdeveloped country could not profitably support a plant of this type, as a market for spring products will not exist until general industrial development is quite advanced. However, in a suitable environment, a plant such as this can realize substantial profits with efficient management, production controls, and sales effort. (Author)
PB-177 939 HC$3.00 MF$0.65

PLANT REQUIREMENTS FOR MANUFACTURE OF WALLBOARD FROM GYPSUM AND FIBER.
Agency for International Development, Washington, D. C. Communications Resources Div.
Dec 62, 33p
Prepared in cooperation with Andrews (George H.) Engineering Associates, Inc., Washington, D. C.

Descriptors: (*Fiberboard, *Industrial production), Panels (Structural), Gypsum, Fibers (Natural), Manufacturing methods, Industrial plants, Industrial equipment, Labor, Costs.

The purpose of this report is to present basic information for establishing a manufacturing plant, in a foreign country, to produce wallboard from gypsum and coconut husk fibers. (Author)
PB-177 940 HC$3.00 MF$0.65

A SMALL PARTICLE BOARD PLANT.
Technical inquiry service.
International Cooperation Administration, Washington, D. C. Office of Industrial Resources.
Jun 59, 35p
Prepared in cooperation with Andrew (George H.) Engineering Associates, Inc., Washington, D. C.

Descriptors: (*Panels (Structural), *Industrial production), Manufacturing methods, Industrial plants, Industrial equipment, Production control, Labor, Costs.
Identifiers: Particle board.

The purpose of this report is to present basic information for establishing and operating a small particle board plant in a foreign country. The plant is designed to produce about 120 boards per hour. Based on current practice in the United States, this is a small plant. The recommended equipment and production methods are modern and have proven profitable when operating under conditions comparable to those assumed. (Author)
PB-177 944 HC$3.00 MF$0.65

ALUMINUM DOOR AND WINDOW SASH.
Technical inquiry service.
International Cooperation Administration, Washington, D. C. Office of Industrial Resources.
Nov 59, 46p
Prepared in cooperation with Lederer (A. M.) and Co., Inc., New York.

Descriptors: (*Structural parts, Aluminum), Costs, Manpower, Extrusion, Assembling, Site selection, Manufacturing methods, Industrial equipment, Doors, Industrial production, Buildings, Industrial plants, Inventory control, Training, Safety.
Identifiers: Sashes (Structural), Windows.

Group 13H — Industrial processes

Aluminum is used in place of or along with wood and other forms of building materials in the manufacture of window and door sash in residential, commercial, and manufacturing structures. Aluminum sash doors and windows are generally made of extruded aluminum sections, glass, aluminum mesh screens, neoprene vinyl, and stainless steel. A wide variety of designs and sizes is manufactured depending upon the use to which the units are to be put. (Author)
PB-177 945 HC$3.00 MF$0.65

LEATHER CHEMISTRY FOR FOREMEN. FIRST YEAR COURSE.
Agency for International Development, Washington, D. C. Communications Resources Div.
For primary bibliographic entry see Field 11G.
PB-177 972 HC$3.00 MF$0.65

LEATHER CHEMISTRY FOR FOREMEN. SECOND YEAR COURSE.
Agency for International Development, Washington, D. C. Communications Resources Div.
For primary bibliographic entry see Field 11G.
PB-177 973 HC$3.00 MF$0.65

LEATHER CHEMISTRY FOR FOREMEN. THIRD YEAR COURSE.
Agency for International Development, Washington, D. C. Communications Resources Div.
For primary bibliographic entry see Field 11G.
PB-177 974 HC$3.00 MF$0.65

LEATHER TECHNOLOGY.
Agency for International Development, Washington, D. C. Communications Resources Div.
For primary bibliographic entry see Field 11G.
PB-177 981 HC$3.00 MF$0.65

13I. Machinery and Tools

FORGE ROLLING OF BILLETS IN TWO PASSES ON ROLLS WITH CHAIN PUSHER.
Foreign Technology Div Wright-Patterson AFB Ohio
For primary bibliographic entry see Field 13H.
AD-668 054 HC$3.00 MF$0.65

REVIEW OF NUMERICAL METHODS IN GAS BEARING FILM ANALYSIS.
Columbia Univ New York Lubrication Research Lab
V. Castelli, and J. Pirvics. Feb 68, 82p Rept no. 11
Contract Nonr-266 (88)

Descriptors: (*Gas bearings, *Numerical analysis), Reviews, Nonlinear systems, Gas flow, Numerical methods and procedures, Configuration, Reynolds number.
Identifiers: Pressure distribution, Computer analysis.

The application of numerical methods to gas bearing problems is of great importance in view of the difficulties encountered by purely analytical methods in dealing with the non-linear character of the governing equations and complicated details of practical geometries encountered. The past ten years have witnessed marked progress in computer tec'nology with accompanying development of numerical analysis. The report presents the best techniques which are applicable to gas bearing systems. (Author)
AD-668 500 HC$3.00 MF$0.65

S8DR ACTUATOR INTERIM REPORT.
Atomics International, Canoga Park, Calif.
For primary bibliographic entry see Field 18I.
For abstract, see NSA 22 08.
NAA-SR-12605 HC$3.00 MF$0.65

GAS BEARING APPLICATIONS IN SPACE POWER TURBOMACHINERY.
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
For primary bibliographic entry see Field 10A.
For abstract, see STAR 06 10.
N68-19606 HC$3.00 MF$0.65

LUBRICATION AND BEARING PROBLEMS IN THE VACUUM OF SPACE.
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
E. E. Bisson. 1966, 38p NASA-TM-X-52208
Refs Conf- Presented At Gami "friction Days," Paris, 5-6 Dec. 1966

Descriptors: *Antifriction bearings, *Bearing alloys, *Spacecraft lubrication, *Vacuum effects, Aerospace environments, Atom concentration, Bibliographies, Gravitational effects, Pressure effects, Radiation effects, Surface properties, Temperature effects.

For abstract, see STAR 06 10.
N68-19608 HC$3.00 MF$0.65

DRY FILM LUBRICATED BALL BEARINGS FOR GIMBALS OSCILLATING AT SMALL ANGLES IN VACUUM.
National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
K. E. Demorest. 16 Feb 68, 26p NASA-TM-X-53707

Descriptors: *Ball bearings, *Gimbals, *Performance tests, *Solid lubricants, *Space environment simulation, *Stable oscillations, Lubricant tests, Operations research.

For abstract, see STAR 06 10.
N68-19731 HC$3.00 MF$0.65

EXPERIMENTAL STABILITY STUDIES OF THE HERRINGBONE GROOVED GAS LUBRICATED JOURNAL BEARING.
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
W. J. Anderson, R. E. Cunningham, and D. P. Fleming. 1968, 23p NASA-TM-X-52416
Conf- Presented At the 2d Intern. Symp. on Gas Lubrication, Design, and Appl. and Exhibit, Sponsored By Asme, Las Vegas, Nevada, 17-20 Jun. 1968

Descriptors: *Dynamic stability, *Gas lubricants, *Grooves, *Journal bearings, Gas bearings, Lines (geometry), Rotors.

For abstract, see STAR 06 10.
N68-19752 HC$3.00 MF$0.65

RESIDUAL STRESS AND SUBSURFACE HARDNESS CHANGES INDUCED DURING ROLLING CONTACT.
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
R. J. Parker, D. W. Reichard, and E. V. Zaretsky. Apr 68, 31p NASA-TN-D-4456
Contract 126-15-02-16-22

Descriptors: *Ball bearings, *Microhardness, *Residual stress, *Stress analysis, Antifriction bearings, Failure, Lubricants, Rockwell hardness, Roller bearings, Steels.

For abstract, see STAR 06 10.
N68-20199 HC$3.00 MF$0.65

WEAR RATE AND FRICTION COEFFICIENT IN LIQUID NITROGEN AND HYDROGEN OF STEEL SLIDING ON POLYMER LAMINATES (VARIOUS FABRICS AND POLYMERS).
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
R. L. Johnson, and D. W. Wisander. Apr 68, 15p NASA-TN-D-4463
Contract 129-03-13-01-22

Descriptors: *Coefficient of friction, *Laminates, *Plastics, *Stainless steels, *Wear tests, Cryogenic equipment, Liquid hydrogen, Liquid nitrogen, Materials tests, Melamine, Polytetrafluoroethylene, Surface properties, Wear.

For abstract, see STAR 06 10.
N68-20325 HC$3.00 MF$0.65

PLANT REQUIREMENTS FOR MANUFACTURE OF BROOMS.
Agency for International Development, Washington, D. C. Communications Resources Div.
For primary bibliographic entry see Field 13H.
PB-177 938 HC$3.00 MF$0.65

PLANT REQUIREMENTS FOR MANUFACTURE OF MECHANICAL SPRINGS.
Agency for International Development, Washington, D. C. Communications Resources Div.
For primary bibliographic entry see Field 13H.
PB-177 939 HC$3.00 MF$0.65

13J. Marine Engineering

A CONTINUOUS INVENTORY PROBLEM.
Final rept.,
Naval Research Lab Washington D C
Herbert Hauptman, and Arthur Ziffer. 21 Feb 68, 15p Rept no. NRL-6689

Descriptors: (*Submarines, Inventory control), (*Inventory control, Optimization), Naval operations, Logistics, Costs, Distribution functions, Probability, Mathematical models, Theorems.
Identifiers: Probability distributions.

A basic inventory model which is concerned with stocking various amounts of n different items for a submarine going on patrol is considered. There are costs for overstocking and understocking each item, a probability distribution which specifies the probability that any number of each item will be required, and an overall volume constraint. The discrete model is then cast into continuous form and the resulting problem in constrained minimization is solved. (Author)
AD-668 167 HC$3.00 MF$0.65

OSCILLATION OF CYLINDERS IN OR BELOW THE FREE SURFACE OF DEEP FLUIDS.
Research and development rept.,
Naval Ship Research and Development Center Washington D C Hydromechanics Lab
Werner Frank. Oct 67, 50p
NSRDC-2375

Descriptors: (*Ships, Hydrodynamics), Ocean waves, Response, Oscillation, Cylindrical bodies, Ship hulls, Boundary value problems, Green's function, Integral equations, Computer programs, Two-dimensional flow, Force (Mechanics), Moments.

The subject of cylinders oscillating in or below the free surface of very deep fluids is developed as a boundary value problem within the framework of linear free-surface theory by distributing source singularities over the submerged portion of the cylinders. A computer program for calculating the hydrodynamic pressure, force, and moment of fluids on these cylinders was devised. The results for various two-dimensional shapes are given in graphical form. (Author)
AD-668 338 HC$3.00 MF$0.65

OUTLINE OF PLAN FOR ENGINEERING STUDIES REFERENCE PLANT CYCLE SELEC-

TION AND SELECTION OF PLANT STEAM CONDITIONS.
Report on integrated Steam Power Plant Phase 1; Preliminary technical report. no. 1.
Newport News Shipbuilding and Dry Dock Co., Va. Engineering Technical Dept.
27 Apr 62, 47p
Contract MA-2967
See also PB-177 850.

Descriptors: (*Merchant vessels, *Steam power plants), Ship turbines, Steam turbines, Marine engines, Marine propulsion, Selection, Gas turbines, Specifications, Control systems, Boilers, Design, Feed pumps, Economics, Maintenance, Marine engineering, Heaters, Systems engineering.

Contents: Outline of plan for engineering studies -- basic reference steam plant cycle, preliminary plant design study and component selection, main plant control system, preliminary overall plant design selection, development of final detailed steam plant heat balance and component selection, final control selection, final report, specifications and arrangement studies; Reference plant cycle selection -- gas air heater versus economizer cycle recommendation, bleed steam and number of stages of feed heating, vacuum considerations; Selection of plant steam conditions -- boiler considerations, feed pump considerations, piping material and flange standards, economics.
PB-177 849 HC$3.00 MF$0.65

PRELIMINARY PLANT DESIGN STUDY AND COMPONENT SELECTION.
Report on integrated steam power plant Phase 1, Part 2.
Newport News Shipbuilding and Dry Dock Co., Va. Engineering Technical Dept.
Jul 62, 203p
Contract MA-2967
See also PB-177 849.

Descriptors: (*Merchant vessels, *Steam power plants), Ship turbines, Steam turbines, Gas turbines, Reduction gears, Marine engines, Power supplies, Auxiliary power plants, Generators, Boilers, Variable-pitch propellers, Propellers (Marine), Marine propulsion, Design, Diesel engines.

Only the major components in the plant were reviewed and only the auxiliary equipment which may influence the selection of the major components discussed. Specifically, these are: (a) main boilers, (b) steam turbines with astern elements, (c) steam turbines without astern elements, (d) reduction gears, (e) reverse reduction gears, (f) controllable reversible pitch propellers, (g) ship's service and emergency generator, (h) auxiliary boilers, (i) emergency propulsion. The study considered various kinds of main steam plant components and combined them into the minimum number of plant designs. Components most suitable for the integrated plant are discussed. (Author)
PB-177 850 HC$3.00 MF$0.65

MAIN PLANT CONTROL SYSTEM.
Report on integrated steam power plant Phase 1, Part 3.
Newport News Shipbuilding and Dry Dock Co., Va. Engineering Technical Dept.
Sep 62, 80p
Contract MA-2967
See also PB-177 850.

Descriptors: (*Merchant vessels, *Steam power plants), Ship turbines, Steam turbines, Gas turbines, Marine engines, Marine propulsion, Boilers, Steam, Control systems, Gas generating systems, Performance (Engineering).
Identifiers: *Boiler-following.

For either of the selected main propulsion plants, two types of plant control were considered: (a) boiler-following and (b) turbine-following. The boiler-following mode is the accepted practice in marine power plants where the boiler follows turbine load changes. With the turbine-following concept, a manually-set speed demand signal would establish the boiler firing rate and the turbine would follow up by accepting the steam as it is generated. From these studies it was concluded that with the turbine-following mode, closer control of boiler steam pressure, boiler drum water level and steam temperature is obtained. Overfiring and underfiring of the boiler is minimized. However, this improvement is gained only by sacrificing overall rate of response of the plant and with a more complex control system than that required for boiler following. Based on a review of the two modes of control, it is recommended thatboiler-following be considered the primary method of control, regardless of the means of main propulsion. (Author)
PB-177 851 HC$3.00 MF$0.65

PRELIMINARY OVERALL PLANT DESIGN SELECTION.
Report on integrated steam power plant, Phase 1, Part 4.
Newport News Shipbuilding and Dry Dock Co., Va.
Sep 62, 23p
Contract MA-2967
See also PB-177 851.

Descriptors: (*Merchant vessels, *Steam power plants), Ship turbines, Steam turbines, Gas turbines, Marine engines, Marine propulsion, Selection, Boilers, Drives, Propellers (Marine), Generators, Power supplies, Gas generating systems, Auxiliary power plants, Diesel engines, Reduction gears, Control systems, Design.
Identifiers: Boiler-following.

The selected major components are: (1) Boiler (a) 1 2-drum, bent-tube, boiler, (b) 600 psig - 865F steam conditions, (c) 4-Y Jet burners or equivalent; (2) Propeller drive machinery (a) Single-casing turbine with astern elements, (b) Locked-train gear, (c) Conventional, fixed-pitch propeller; 3) Electric plant (a) 1 - 750 KW turbo-generator for ship's service, non-condensing, (b) 1 - 750 KW gas turbine generator for ship's standby service, (c) 1 - 75 KW diesel driven emergency generator, (4) Emergency propulsion and emergency steam -- direct connection of 750 KW (1100 HP) split-shaft gas turbine in main reduction gear with waste heat boiler, (5) Control system -- plant control mode will be the conventional boiler-following. (Author)
PB-177 852 HC$3.00 MF$0.65

DEVELOPMENT OF FINAL DETAILED STEAM PLANT HEAT BALANCE AND COMPONENT SELECTION.
Report on integrated steam power plant, Phase 1, Part 5.
Newport News Shipbuilding and Dry Dock Co., Va. Engineering Technical Dept.
Oct 62, 249p
Contract MA-2967
See also PB-177 852.

Descriptors: (*Merchant vessels, *Steam power plants), Ship turbines, Steam turbines, Gas turbines, Marine engines, Marine propulsion, Fuel consumption, Auxiliary power plants, Heating, Generators, Drives, Boilers, Distilling plants, Heaters, Pumps, Selection, Efficiency, Economics.
Identifiers: Heat balance.

The report considers various types of auxiliary systems and components and recommends specific units which are used in conjunction with the major components recommended in Parts I, II, III, and IV to establish a reference plant cycle. This cycle is considered the least-complex, workable cycle that can power the ship although it does not represent the optimum in plant efficiency. Changes to the reference cycle which would improve fuel economy are then considered and the changes recommended or rejected depending upon the effect on reliability of the plant and comparison of the higher initial cost versus the lower annual fuel costs. It is recommended that a regenerative plant cycle with a condensing ship's service turbo-generator and two main turbine extraction points be selected for the Integrated Steam Power Plant. The bleed steam would be used to supply a low-pressure distilling plant and for feedwater heating in the deaerating feed tank and in a low-pressure heater and drain cooler. Recommendations for auxiliary systems and components are also made. (Author)
PB-177 853 HC$3.00 MF$0.65

FINAL CONTROL SELECTION.
Report on integrated steam power plant, Phase 1, Part 6.
Newport News Shipbuilding and Dry Dock Co., Va. Engineering Technical Dept.
Oct 62, 181p
Contract MA-2967
See also PB-177 853.

Descriptors: (*Merchant vessels, *Steam power plants), Ship turbines, Steam turbines, Gas turbines, Marine engines, Marine propulsion, Control systems, Selection, Auxiliary power plants, Data processing systems, Pneumatic systems, Hydraulic systems, Oil burners, Blowers.

The report recommends the following for use in the Integrated Steam Power Plant: (1) Electric signal transmission for the information data system and essentially all plant controls, (2) Pneumatic operation for all modulating power devices with the exception of hydraulic operation for the main turbine and S.S.T.G. throttle valves, (3) A motor-generator battery set floating on the power line for back up of the electrical control system power supply, (4) A 'Nash,' or equal, water sealed type air compressor, (5) Provisions for enclosing electronic control equipment in an air conditioned area, (6) A metered flow tie-back combustion control system, (7) A three element feedwater control system, (8) Four, steam atomizing, Y-jet oil burners, (9) A fully automated burner control system, (10) Individual flame sensors and diesel oil lighters for each main burner, (11) A solid state digital data information system, (12) Eight electric motor driven steam soot blowers for main boiler cleaning, (13) An automatically selective soot-blower control system.
PB-177 854 HC$3.00 MF$0.65

CASUALTY ANALYSIS, MANNING ANALYSIS AND MACHINERY SPACE ARRANGEMENTS.
Report on integrated steam power plant, Phase 1, Part 7-A.
Newport News Shipbuilding and Dry Dock Co., Va. Engineering Technical Dept.
Nov 62, 219p
Contract MA-2967
See also PB-177 854.

Descriptors: (*Merchant vessels, *Steam power plants), Ship turbines, Steam turbines, Gas turbines, Marine engines, Marine propulsion, Reliability, Auxiliary power plants, Malfunctions, Manpower studies, Maintenance, Economics, Scheduling, Training, Human engineering, Job analysis, Management engineering.

Contents: Casualty analysis; Manning analysis -- normal operation and maintenance duties of engineering department personnel, Manning requirements, Manning economics, Comparison of manning schedules investigated; Machinery space arrangements.
PB-177 855 HC$3.00 MF$0.65

SUMMARY REPORT.
Report on integrated steam power plant, Phase 1, Part 7-B.
Newport News Shipbuilding and Dry Dock Co., Va. Engineering Technical Dept.

Nov 62, 119p
Contract MA-2967
See also PB-177 855.

Descriptors: (*Merchant vessels, *Steam power plants), Ship turbines, Steam turbines, Gas turbines, Marine engines, Marine propulsion, Cargo ships, Thermodynamics, Control systems, Selection, Human engineering, Personnel management, Fuels, Economics, Design.
Identifiers: Heat balance.

Contents: Plant design; Final selection of steam conditions; Heat balances; Electric load analysis; Arrangement of machinery and engineer's operating station; Manning; Rules deviations; Economics; Use of low cost residual fuel with the recommended plant; Recommendations for work to be done in phase II.
PB-177 856 HC$3.00 MF$0.65

OUTLINE SPECIFICATIONS.
Report on integrated steam power plant, Phase I, Part 8.
Newport News Shipbuilding and Dry Dock Co., Va. Engineering Technical Dept.
Nov 62, 150p
Contract MA-2967
See also PB-177 856.

Descriptors: (*Merchant vessels, *Steam power plants), Ship turbines, Steam turbines, Gas turbines, Marine engines, Marine propulsion, Specifications, Auxiliary power plants, Reduction gears, Propellers (Marine), Oils, Water supplies, Gas generating systems, Control systems, Pumps, Diesel engines, Generators, Electrical equipment, Lighting equipment, Instruction manuals, Engines + motors, Switching circuits, Paints, Machines.
Identifiers: Painting machinery.

Contents: General provisions; Main and auxiliary machinery; Main turbine; Reduction gear - main propulsion; Main shafting, bearings, and propeller; Vacuum equipment; Evaporating plants; Fuel oil, diesel oil, and oily ballast systems; Lubricating oil system; Salt water systems; Potable water system; Feed and condensate systems; Steam generating plant; Forced draft system; Steam and exhaust systems; Remote control; Compressed air systems; Pumps; Piping; Insulation and lagging for piping and machinery; Emergency diesel engine; Auxiliary turbines; Tanks - miscellaneous; Ladders and gratings; Engineer's workshop and stores; Painting machinery; Instrumentation; Spare parts; Electrical systems; Generators; Switchboards; Electrical distribution; Auxiliary motors and controls; Lighting; Plans and instruction books; Test and trials; Centralized machinery control.
PB-177 857 HC$3.00 MF$0.65

INTEGRATED GAS TURBINE POWER PLANT DESIGN STUDY.
Final rept.
General Electric Co., Schenectady, N. Y.
15 May 64, 274p
Contract MA-3000
Prepared in cooperation with Sharp (George G.), Inc., New York.

Descriptors: (*Gas turbines, Design), (*Marine engines, Gas turbines), Axial-flow turbines, Steam turbines, Gas generating systems, Fuels, Power supplies, Auxiliary power plants, Gas turbine regenerators, Cargo ships, Costs, Shipborne, Heating, Specifications, Axial-flow compressors.
Identifiers: LM-100 engines.

A study was made of a 20,000-SHP, single-screw, integrated gas turbine power plant. A regenerative, two-shaft gas turbine was selected for the main power plant after studying several different gas turbine cycles. The expected all-purpose fuel rate for the ship at design conditions of 20,000 SHP, 105 prpm, 75-F inlet temperature and using specification residual fuel is 0.496 lb/SHP-hr. A mechanical drive transmission system was selected having a double-reduction gear and a controllable-and reversible-pitch propeller. An auxiliary steam system is used with steam generated by means of a heat-recovery boiler and supplemented by auxiliary hot gas generators. A gas turbine-generator set, mounted on the main deck, provides ships' standby electrical service and port electrical power requirements. This set also is arranged to utilize exhaust heat to provide heating services in port. The location of this set enables the engine room to be secured in port during idle conditions to facilitate maintenance. An attractive and significant potential of the gas turbine is the improvement in output and efficiency as the firing temperature is increased with advances in material and fuel technology. (Author)
PB-177 858 HC$3.00 MF$0.65

FAIRBANKS MORSE ADVANCED DESIGN MOTOR SHIP MACHINERY PLANT 20,000 SHP.
Phase I study (Final).
Fairbanks, Morse and Co., Beloit, Wis.
1967, 210p
Contract MA-3390
Prepared in cooperation with Rosenblatt (M.) and Son, Inc., New York. See also Appendix, PB-177 861.

Descriptors: (*Merchant vessels, Diesel engines), (*Diesel engines, *marine engines), Marine surface propulsion, Cargo ships, Economics, Maintenance, Costs, Fuel consumption, Fuel oil, Reduction gears, Auxiliary power plants, Propellers (Marine), Performance (Engineering).
Identifiers: Fairbanks Morse 38A20 engines, PD 108.

The principal objective of the study is to investigate, through the application of technological advancement and modern power plant techniques, a diesel machinery system for a general (dry) cargo ship to effect greater overall economy of operation and to emphasize such factors as low first cost, low maintenance cost, and ease of automation, in addition to fuel economy. The diesel machinery plant developed by the study and presented in the report provides a maritime power plant satisfying all of the above stated objectives. The new engine is of the opposed piston design and is rated at 1,000 BHP per cylinder. Two versions of the engine are available; a six-cylinder in line engine rated at 6,000 BHP and a 12-cylinder 'V' engine rated at 12,000 BHP. For this application, the 12-cylinder 'V' engine is used and downrated to 10,500 BHP to match ship requirements. (Author)
PB-177 860 HC$3.00 MF$0.65

20,000 SHP ADVANCED DIESEL PLANT. APPENDIX I - APPENDIX XII.
Appendix to Phase I Study (Final).
Fairbanks, Morse and Co., Beloit, Wis.
1967, 286p
Contract MA-3390
Prepared in cooperation with Rosenblatt (M.) and Son, Inc., New York. See also PB-177 860.

Descriptors: (*Merchant vessels, Diesel engines), (*Diesel engines, *Marine engines), Costs, Marine surface propulsion, Cargo ships, Auxiliary power plants, Weight, Specifications, Mechanical drawings, Propellers (Marine), Performance (Engineering), Drag, Internal combustion engine noise, Maneuverability, Generators.
Identifiers: Fairbanks Morse 38A20 engines, PD108, Heat balance.

Contents: Uniform costing; Weight summary; Outline specifications; Power plant equipment list; Engine drawings; Machinery drawings; Resistance and powering calculations; Sound level calculations; Maneuverability study; Electric load analysis; Heat balance calculations; Cost calculations -- auxiliary machinery plant.
PB-177 861 HC$3.00 MF$0.65

INTEGRATED GAS TURBINE POWER PLANT.
Final rept. on phase 1.
Pratt and Whitney Aircraft, East Hartford, Conn.
1967, 359p PWA-2094
Contract MA-3001

Descriptors: (*Gas turbines, *Marine engines), (*Merchant vessels, Marine propulsion), Feasibility studies, Cost effectiveness, Maintenance, Economics, Ship hulls, Optimization, Fuel oil, Ingestion (Engines), Sea water, Performance (Engineering).
Identifiers: PD 108, FT-4 engines.

The feasibility study considers the use of gas turbines for marine propulsion as a means of simplifying and integrating the ships' propulsion machinery in an effort to effect lower first costs, lower maintenance costs, and lower operating costs of United States Merchant ships. (Author)
PB-177 862 HC$3.00 MF$0.65

13K. Pumps, Filters, Pipes, Fittings, Tubing, and Valves

WAVE DAMPING EFFECTS OF SCREENS; HYDRAULIC MODEL INVESTIGATION.
Final rept.,
Army Engineer Waterways Experiment Station Vicksburg Miss
Garbis H. Keulegan. Mar 68, 82p Rept no. AEWES-RR-2-12

Descriptors: (*Water waves, Filters (Fluid)), (*Filters (Fluid), Attenuation), Hydraulic models, Cylindrical bodies, Reflection, Mathematical analysis, Surface properties, Theory, Flow fields, Reynolds number, Tables, Diagrams.
Identifiers: *Screen filters.

An expression is derived for the damping of translation waves by screen filters in terms of filter extent and length of wave. Derivation involves the resistance coefficient of screens; and tests show that this term cannot be derived from the known resistance law of circular cylinders but must be determined for a particular screen for the condition of steady flow. Observed damping and computed damping agree fairly well. Results are extended intuitively to the case of surface waves. The analysis is compared with the Goda-Ippen theory of screen filters to establish the conditions for the equivalency of results in these two approaches. (Author)
AD-668 236 HC$3.00 MF$0.65

PLANT REQUIREMENTS FOR MANUFACTURE OF ASBESTOS - CEMENT PIPE.
International Cooperation Administration, Washington, D. C. Technical Aids Branch.
For primary bibliographic entry see Field 13H.
PB-177 932 HC$3.00 MF$0.65

13L. Safety Engineering

FEASIBILITY OF BURNING EMULSIFIED FUEL IN A 7LM100 ENGINE.
General Electric Co Cincinnati Ohio Flight Propulsion Div
For primary bibliographic entry see Field 21D.
AD-667 902 HC$3.00 MF$0.65

REACTIVITY WORTH OF A CENTRAL SAFETY ROD WITH AND WITHOUT AN INTERNAL SCATTERER.
Battelle-Northwest, Richland, Wash. Pacific Northwest Lab.
For primary bibliographic entry see Field 20H.
For abstract, see NSA 22 08.
BNWL-618 HC$3.00 MF$0.65

CHEMICAL REACTIONS OCCURRING IN FIRE FIGHTING WITH THE AID OF HALONES.

Ueber Chemische Vorgaenge Bei Der Brandbekaempfung Mit Halonen
Deutsche Versuchsanstalt Fur Luft- Und Raumfahrt, Munich (West Germany). Institut Fuer Flugtreib Und Schmierstoffe.
J. Kern. Jan 68, 55p DLR-FB-68-04, DVL-701 Lang- in German, English Summary

Descriptors: *Fire extinguishers, *Halogen compounds, *Pyrolysis, Aircraft hazards, Bromine compounds, Carbon tetrafluoride, Chlorine fluorides, Difluoro compounds, Fire fighting, Methane, Oxygen.

For abstract, see STAR 06 10.
N68-20058 HC$3.00 MF$0.65

INDEX TO NUCLEAR SAFETY, A TECHNICAL PROGRESS REVIEW BY CHRONOLOGY, PERMUTED TITLE, AND AUTHOR. VOL. 1, NO. 1 THROUGH VOL. 8, NO. 6.
Oak Ridge National Lab., Tenn.
For primary bibliographic entry see Field 18I.
For abstract, see NSA 22 08.
ORNL-NSIC-41 HC$3.00 MF$0.65

THE SNOWY TORRENTS - AVALANCHE ACCIDENTS IN THE UNITED STATES, 1910-1966,
Alta Avalanche Study Center, Sandy, Utah.
For primary bibliographic entry see Field 8L.
PB-177 607 HC$3.00 MF$0.65

POLICE TRAFFIC SERVICES AND ROAD SAFETY: AN EVALUATION OF THE LITERATURE.
Interim rept. no. 1,
Travelers Research Center, Inc., Hartford, Conn.
E. F. Fennessy, Jr., and H. C. Joksch. Jan 68, 164p
TRC-7636-300
Contract FH-11-6604

Descriptors: (*Traffic, Safety), Police, Motor vehicle accidents, Passenger vehicles, Statistical analysis, Law, Effectiveness, Reviews.

The specific purposes of this report are to: (a) assemble all available studies that have scientifically attempted to measure the relationship of police services to highway safety and accident reduction; (b) critically evaluate these studies; and, (c) develop research recommendations that would lead to an improved understanding of their relationship. A discussion and description of the scope, objectives and functions of police activities in the motor vehicle transportation system is included to provide a contextual framework in which to examine the results of the quantitative literature review presented here. The major portion of this report consists of the reviews of previous research studies. These studies were evaluated with particular emphasis on the adequacy of the following factors: approach, completeness of reporting, details of reporting of data, statistical techniques, acceptability--on a methodological basis--of the conclusions and objectivity (e. g., could the study be duplicated by an independent investigator). The general finding of this literature review is that there are some, sometimes very strong, indications that police traffic law enforcement activities can reduce accidents. However, there is no adequate quantitative and objective evidence available that would enable us to recommend any 'desirable' or 'optimal' levels of traffic law enforcement and standards for police performance based on the literature reviewed. Major research needs were identified in the measurement of this relationship and research recommendations were developed. These recommendations include studies of the relationship of violations to accidents and traffic flow, experimental studies of the effectiveness of alternative enforcement techniques, public attitudes on police traffic services, the psychology of traffic law enforcement, and the role of punishment in the enforcement process. Recommendations for supporting studies are also included. (Author)
PB-177 863 HC$3.00 MF$0.65

THE OVERTURNING OF CARS AS A RESULT OF SEVERE BRAKING,
Road Research Lab., Crowthorne (England).
R. N. Kemp, and I. D. Neilson. 1967, 27p RRL-LR103

Descriptors: (*Motor vehicle accidents, *Brakes), Man-machine systems, Safety, Safety harness, Passenger vehicles, Motor vehicle operators, Tires, Design, Steering, Stability, Equilibrium, Protection, Equations, Reports, Great Britain.

In the course of some braking experiments, a car was heavily braked on a dry surface from a speed of about 60 mile/h. It swung round violently and overturned. A theoretical study of the incident suggested that the overturning could be explained by the car being braked within a small critical range of brake pressures, the rear wheels losing adhesion and causing the car to spin, thus building up a sideways acceleration and a rotation in roll. This might have been sufficient to overturn the car on a surface having a high coefficent of friction. The study also showed that at least two other factors might be expected to increase the tendency to overturn viz., if the braking were reduced as soon as most of the car's weight came on to the offside wheels or if brake fade occurred at the front wheels. Because of these different factors, it would seem likely that cars of different design could overturn given appropriate conditions. Recent designs have usually had a lower ratio of height of centre of gravity to track than the 0.46 of the car in question and this is probably the most effective way of preventing cars from overturning. The most important feature of the incident from the point of view of road safety is probably the initial loss of directional control; on the road it seems likely that most cars would strike something before they had reached the point of overturning or if the object struck happened to be a kerb, this would greatly increase the tendency to overturn.
PB-177 896 HC$3.00 MF$0.65

STUDY OF SCHOOL BUS SAFETY.
Final rept.
National Commission on Safety Education, Washington, D. C.
31 Dec 67, 383p
Contract FH-110-6525
Availability: Original document in color until exhausted.

Descriptors: (*Passenger vehicles, Safety), Students, Transportation, Standards, Motor vehicle operators, Public opinion, Statistical data, Maintenance, Supervision.
Identifiers: School buses.

During a period of very rapid growth, both in the number of pupils transported and in vehicular traffic on the highways, the safety record achieved in the operation of school buses has remained relatively good. The framework for a sound, workable, public school transportation program has been established within most states, even though coordination and implementation have not been carried out to the extent desirable in some cases. Notwithstanding a division of responsibilities for transportation operation between the educational agency and other agencies of a state, in most instances such division has reflected the service roles of the other agencies in relation to functions of vehicular control and driver licensing. The need for periodic inspection of school buses and an adequate program of school bus maintenance is generally recognized. The direct supervision and control of pupils transported is a function of the school bus driver in cooperation with the principal or head of the school who has over-all responsibility for pupil behavior on the way to an from school. Apparently all of the states have established machinery for the collection of school bus accident data though collection procedures and types of information asked for should be critically evaluated in terms of potential use. About 74 percent of the states require some type of physical examination for school bus drivers, and 80 percent require a special license or permit to operate a school bus. (Author)
PB-177 905 HC$3.00 MF$0.65

OCCUPANT PROTECTION IN VEHICLE INTERIOR RECOMMENDED PROGRAMS.
Final rept.,
Cornell Aeronautical Lab., Inc., Buffalo, N. Y.
R. H. Dufort, and R. A. Wolf. 13 Oct 67, 101p
CAL-YB-2500-V-1
Contract FH-11-6574

Descriptors: (*Passenger vehicles, Safety), Motor vehicle accidents, Crash injuries, Tolerances (Physiology), Impact shock, Protection, Safety harness.

A major premise of this study is that the automobile interior presents a hostile environment to a large segment of the population involved in motor vehicle accidents and that further understanding of the influence of vehicle interior design principles for reducing the effects of impact may further reduce crash injury consequences. About one-half of all deaths and about one in five disability injuries are attributable to the motor vehicle. This study was initiated for the following purposes: (1) To define research programs needed to provide a significant increase in level of protection for occupants of passenger cars. (2) To review the data to establish what is available and relevant to formulation of new vehicle safety standards and outline research programs needed for this purpose. (Author)
PB-177 906 HC$3.00 MF$0.65

RESEARCH TO IMPROVE THE PROCESS OF ACCIDENT INVESTIGATION, VOLUME I.
Summary rept.,
Cornell Aeronautical Lab., Inc., Buffalo, N. Y.
J. M. Keryeski, and J. W. Garrett. 5 Jan 68, 74p
CAL-VJ-2515-V-1
Contract FH-11-6651

Descriptors: (*Motor vehicle accidents, Data), Collecting methods, Communication systems, Data transmission systems, Photography, Safety devices, Passenger vehicles, Traffic, Reports, Police.

This report is the first in a series of five reports deveoted to the evaluation of 'state of the art' technology developed for other purposes to determine where it can be applied to accident investigation, especially in the determination of causation. Its purpose is to briefly describe all data needs as well as each proposed new information collection method, technique or equipment that is proposed for accident information collection. Succeeding reports will deal with the evaluation of each new idea proposed in this preliminary report along with training and operating guides to assure proper use of technology developed for the collection of accident information. (Author)
PB-177 907 HC$3.00 MF$0.65

13M. Structural Engineering

CONTINUOUS POTABLE WATER SUPPLY FOR FALLOUT SHELTERS AND OTHER ISOLATED SITES.
Northwestern Univ., Evanston, Ill. Technological Inst.
For primary bibliographic entry see Field 13B.
AD-450 653 HC$3.00

AIR DISTRIBUTION STUDIES IN MULTI-ROOM SHELTERS.
Protective Structures Development Center Fort Belvoir Va
For primary bibliographic entry see Field 13A.
AD-667 911 HC$3.00 MF$0.65

ELASTIC AND MAXIMUM STRENGTH ANALYSES OF POST-BUCKLED RECTANGULAR PLATES BASED UPON MODIFIED VERSIONS OF REISSNER'S VARIATIONAL PRINCIPLE,
Stanford Univ Calif Dept of Aeronautics and Astronautics

J. Mayers, and E. Nelson. Apr 66. 70p Rept no. SUDAAR-262
Contract DA-44-177-AMC-115 (T)

Descriptors: (*Panels (Structural), Structural properties), Buckling (Mechanics), Elasticity, Numerical analysis, Boundary value problems, Metal plates, Plasticity, Deformation, Theory, Optimization.
Identifiers: *Reissner's variational principle.

The postbuckling and maximum strength analyses of uniformly shortened, simply supported rectangular plates with straight unloaded edges are obtained by employing Reissner's variational principle in conjunction with a deformation theory of plasticity. The results are compared to (1) experimental data for a rectangular plate in which the test conditions basically reflect the boundary conditions specified in the present analyses, and (2) a potential energy solution that correlates well with experiment, but in which the effect of waveform change on the average stress carried by the plate is accounted for only in a gross manner and the effect of small local unloading is neglected. Good agreement with experiment establishes confidence in the new approach and indicates that the simplified technique utilized in the potential energy solution to compensate for waveform changes may be employed for engineering purposes. (Author)
AD-667 941 HC$3.00 MF$0.65

BRIDGE FOUNDATIONS IN PERMAFROST AREAS GOLDSTREAM CREEK, FAIRBANKS, ALASKA.
Technical rept.,
Cold Regions Research and Engineering Lab Hanover N H
Frederick E. Crory. Feb 68. 37p Rept no. CRREL-TR-180
Prepared in cooperation with Bureau of Public Roads, Washington, D. C.

Descriptors: (*Bridges, Foundations (Structures)), (*Permafrost, Alaska), Roads, Construction, Rivers, Structures, Atmospheric temperature, Cold weather tests, Anchors (Structural), Terrain, Arctic regions.

Under a joint research project between the Alaska Department of Highways and the U. S. Army Cold Regions Research and Engineering Laboratory, cooperative field observations and tests were conducted during and following construction of the Goldstream Creek bridge, Fairbanks, Alaska. This report presents site investigations and bridge foundation design of the Alaska Department of Highways, bridge pile installation data, and ground temperature conditions for the six-month period following construction. Two test piles and three anchor piles were installed in proximity to the site and load settlement tests were performed. Observations of bridge performance will be continued for a three-year period after construction. (Author)
AD-667 945 HC$3.00 MF$0.65

AEROSPACE EXPANDABLE AND MODULAR STRUCTURES CONFERENCE (3rd), TRANSACTIONS, HELD AT THE CARILLON HOTEL, MIAMI BEACH, FLORIDA, MAY 16-18, 1967.
Air Force Aero Propulsion Lab Wright-Patterson AFB Ohio
Feb 68. 728p Rept no. AFAPL-TR-68-17

Descriptors: (*Expandable structures, Symposia), (*Modular space construction, Symposia), State-of-the-art reviews, Satellite antennas, Manned spacecraft, Communication satellites (Passive), Flexible structures, Inflatable structures, Solar collectors, Shelters, Extravehicular activity, Manufacturing methods, Plastics, Reentry vehicles.
Identifiers: Windows, PAGEOS satellite, Airlocks.

This report contains a presentation of technical contributions summarizing the status of current and significant research in the fields of expandable and modular structures. The report is based upon the discussions at the Third Aerospace and Modular Structures Conference held 16-18 May 1967 at the Carillon Hotel, Miami Beach, Florida. The conference transactions have been arranged in the order of presentation during the six sessions of the conference.
AD-668 181 HC$3.00 MF$0.65

RESEARCH IN MATERIALS SCIENCE AND ENGINEERING.
Massachusetts Inst of Tech Cambridge
For primary bibliographic entry see Field 11G.
AD-668 215 HC$3.00 MF$0.65

SURFACE MOORINGS. REVIEW OF PERFORMANCE.
Technical rept.,
Woods Hole Oceanographic Institution Mass
H. O. Berteaux. Mar 68. 68p Rept no. WHOI-Ref-68-20
Contract N00014-66-C-0241

Descriptors: (*Mooring, Performance (Engineering)), History, Cables (Mechanical), Failure (Mechanics), Wire, Oceanographic equipment, Cordage, Loading (Mechanics), Impact shock, Nylon, Sound signals, Instrumentation, Stresses, Tables, Buoys.

The report presents a brief history of the moorings and tabulates their comparative performance. It also reviews the possible types of failures and the difficulties of failures evaluation. A theory which could explain the failure of the wire ropes is submitted. Improvements in the mooring systems evaluation and hardware are briefly outlined in the conclusion. Detailed information documenting the report is gathered in the Appendix. (Author)
AD-668 217 HC$3.00 MF$0.65

AN ANALYSIS OF ROOF WASHDOWN VERSUS APPLIED SHIELDING AS A FALLOUT COUNTERMEASURE.
Stanford Research Inst Menlo Park Calif
Hong Lee. Dec 66. 41p
Contract N00228-66-C-0231

Descriptors: (*Fallout shelters, *Roofs), (*Radioactive fallout, *Decontamination), Civil defense systems, Shielding, Cleaning, Radiological contamination, Radiological dosage, Protection, Reliability, Costs.
Identifiers: Washdown.

The study provides guidance on the basic applicability and relative worth of roof washdown as a fallout radiation countermeasure. The basic purpose of roof washdown is to reduce the radiation dose to occupants of a building by preventing or reducing the accumulation of fallout on the roof. However, the roof washdown system does not affect the penetration of the roof by radiation from other sources. It was found that under some circumstances a roof washdown system is a useful means for increasing the protection of building interiors and that, in general, the cost of a washdown system for large roof area structures with smooth sloped roofs will be less than the cost of providing an equivalent amount of shielding. However, applied shielding provides 100 percent reliability whereas roof washdown systems may not be as reliable. (Author)
AD-668 220 HC$3.00 MF$0.65

BLAST ATTENUATION STUDIES IN DIVIDING WALL PROTECTIVE CONSTRUCTION.
Army Engineer Waterways Experiment Station Vicksburg Miss
B. R. Sullivan, and A. A. Bombich. Sep 66. 22p Rept no. Miscellaneous Paper-6-840

Descriptors: (*Walls, Buffers), (*Blast, Attenuation), Safety, Construction materials, Protection, Shock waves, Propagation, Detonations, Accidents, Explosive materials, Propellants, Absorption, Pressure, Thermodynamics, Sandwich construction, Composite materials, Concrete, Expanded plastics, Sand, Stresses.
Identifiers: Bunkers.

The paper presents the preliminary results of an investigation authorized by the Armed Services explosives safety board as a part of the supporting studies for the design of facilities to reduce the risk of explosion propagation being conducted by Picatinny Arsenal. (Author)
AD-668 237 HC$3.00 MF$0.65

EVALUATION OF METHODS OF ATTENUATING BLAST PRESSURES ON WALLS.
Army Engineer Waterways Experiment Station Vicksburg Miss
B. R. Sullivan, and A. A. Bombich. Nov 66. 36p Rept no. Miscellaneous Paper-6-856

Descriptors: (*Walls, Protection), (*Blast, Attenuation), Loading (Mechanics), Structures, Design, Shock waves, Explosive materials, Pressure, Manufacturing methods, Storage, Maintenance, Composite materials, Sandwich construction, Reinforced concrete, Stresses, Effectiveness, Impedance matching, Configuration.
Identifiers: Overpressure.

The objective of the study is the experimental evaluation of energy dissipative characteristics of various materials for use in dividing-wall protection schemes. (Author)
AD-668 238 HC$3.00 MF$0.65

THE 'IKHTIANDR-66' EXPERIMENT.
Department of the Navy Washington D C
Yu. M. Barats, Yu. Yu. Kachuro, Yu. N. Kiklevich, and V. I. Pesok. 25 Mar 68. 9p Rept no. Trans-2569
Trans. of Sudostroenie (USSR) n1 p26-8 1968.

Descriptors: (*Underwater, USSR), Laboratories, Deep water, Safety, Design, Pressure, Shallow water, Physiology, Life support, Respiration.
Identifiers: Translations.

In August 1966, an underwater research club, conducted an experiment with an underwater house, 'Ikhtiandr-66.' Aquanauts spent a total of 168 hours in the underwater house at a depth of 11 meters. While not denying the importance of mastering great depths as quickly as possible, the underwater research club 'Ikhtiandr' proposes tackling complex problems which can be solved by underwater laboratories submerged at depths up to 30 meters. (Author)
AD-668 300 HC$3.00 MF$0.65

BLAST CASUALTY PREDICTION-PAST, PRESENT, AND FUTURE.
Cosmic Inc Bethesda Md
For primary bibliographic entry see Field 6U.
AD-668 342 HC$3.00 MF$0.65

CALCULATION OF THE LOAD CARRYING CAPACITY OF INITIALLY SLIGHTLY IMPERFECT THIN WALLED CIRCULAR CYLINDRICAL SHELLS OF FINITE LENGTH.
Interim rept.,
Stanford Univ Calif Dept of Aeronautics and Astronautics
K. Y. Narasimhan, and Nicholas J. Hoff. Dec 67. 106p Rept no. SUDAAR-329
AFOSR-68-0471
Contract AF 49 (638)-1276

Descriptors: (*Structural shells, Buckling (Mechanics)), Loading (Mechanics), Cylindrical bodies, Walls, Thickness, Stability, Differential equations, Deformation, Compressive properties.
Identifiers: *Thin-walled structures.

The nonlinear partial differential equations of von Karman and Donnell governing the deformations of initially imperfect cylindrical shells are reduced

to a consistent set of ordinary differential equations. A numerical procedure is then developed for the solution of these equations together with the associated boundary conditions. This method is used to determine the number of waves at buckling as well as the load carrying capacity of imperfect cylindrical shells of finite length subjected to uniform axial compression in the presence of the least amount of restraint along the simply supported boundaries. It is found that details of the boundary conditions have little effect on the number of waves into which the shell buckles around the circumference. This number is determined essentially by the length-to-radius and radius-to-thickness ratios. The absence of an edge restraint to circumferential displacements reduces the classical value of the buckling load by a factor of about two as compared to the classical value. On the other hand, shells with these boundary conditions are less sensitive to initial imperfections in the shape, and thus the maximal load supported in the presence of unavoidable initial deviations can be the same for shells with and without a restraint to circumferential displacements along the edges. (Author)
AD-668 450 HC$3.00 MF$0.65

PLANT REQUIREMENTS FOR MANUFACTURE OF FLUSH DOORS.
International Cooperation Administration, Washington, D. C. Technical Aids Branch.
For primary bibliographic entry see Field 13H.
PB-177 929 HC$3.00 MF$0.65

ALUMINUM DOOR AND WINDOW SASH.
International Cooperation Administration, Washington, D. C. Office of Industrial Resources.
For primary bibliographic entry see Field 13H.
PB-177 945 HC$3.00 MF$0.65

TUNNELING, THE STATE OF THE ART,
Mayo (Robert S.) and Associates, Lancaster, Pa.
Robert S. Mayo, Thomas Adair, and Robert J. Jenny. Jan 68, 27p
Contract H-766
A review and evaluation of current tunneling techniques and costs, with emphasis on their application to urban rapid-transit systems in the U.S.A. Prepared in cooperation with Department of Housing and Urban Development, Washington, D. C.

Descriptors: (*Underground structures, State-of-the-art reviews), (*Transportation, Urban areas), Construction, Earth-handling equipment, Urban planning, Railroads, Sewage, Costs, History, Safety, Rock (Geology), Soils, Concrete, Photographs.
Identifiers: Tunnels, Rapid transit systems, Graphs (Charts).

This report fills the need for a comprehensive review and evaluation of the state of the art of tunneling. Recent developments are reported in detail, based on the author's inspection of tunnel projects now underway in the United States, Canada, Europe, and Japan. These personal inspections uncovered a number of recent technological advances that may be adaptable to tunnel projects in this country. A thorough research of engineering publications also has been conducted and pertinent facts relating to tunneling have been incorporated in this report. Throughout the report, an effort has been made to present technical information in layman's language wherever possible. Chapter 3 covers rock tunneling with mechanical excavators and by conventional drilling and blasting methods. Soft-ground and subaqueous tunneling by various methods is described in Chapter 4. It includes a section on the various types of lining used for ground support. Chapter 10 contains the authors' recommendations for specific research, development and demonstration projects, as well as the authors' evaluation of how the state of the art of tunneling will evolve in the next five to ten years. (Author)
PB-178 036 HC$3.00 MF$0.65

14. METHODS AND EQUIPMENT

14A. Cost Effectiveness

EFFECTIVE USE OF FEDERAL LABORATORIES.
Office of the Director of Defense Research and Engineering Washington D C Office for Lab Management
For primary bibliographic entry see Field 5A.
AD-668 344 HC$3.00 MF$0.65

NOTE ON THE FORMAT OF DEVELOPMENT COST PLANS FOR ELDO PROJECTS.
European Space Vehicle Launcher Development Organization, Paris (France).
For primary bibliographic entry see Field 22D.
For abstract, see STAR 06 10.
N68-20391 HC$3.00 MF$0.65

14B. Laboratories, Test Facilities, and Test Equipment

DYNAMIC ANALYSIS OF A PROPOSED WAVE ENERGY TIMER,
Harry Diamond Labs., Washington, D. C.
David S. Bettwy. 5 Mar 64, 19p HDL-TR-1196

Descriptors: (*Timing devices, Mechanical waves), Performance (Engineering), Analysis, Ordnance, Differential equations, Motion, Analog computers.

A recently proposed wave energy timer was evaluated by HDL to determine its potential as a mechanical timing device for ordnance applications. Thetimer is intended to provide a continuous output shaft motion, as opposed to the incremental motion of other mechanical timers, and have complete assurance of selfstarting without the deterioration of frequency stability usually related to self-starting mechanical timers. The analysis presented is based on a simplified timer system since the primary objective was to determine if the system could maintain a relatively constant rate of rotation over a usable range of driving torque. Differential equations of motion were derived, and an analog computer was used to solve these equations for several different parameters. The results of the study indicate that the wave energy timer described has a potential use as a mechanical timing device for ordnance applications. (Author)
AD-447 298 HC$3.00

LIQUID SURFACE LEVITATION USED AS A MEANS OF ULTRASONIC IMAGE CONVERSION FOR MATERIALS INSPECTION.
Technical rept.,
Army Materials and Mechanics Research Center Watertown Mass
Otto R. Gericke, and Robert C. Grubinskas. Mar 68, 25p Rept no. AMMRC-TR-68-06

Descriptors: (*Non-destructive testing, *Ultrasonic radiation), Image converters, Liquids, Surfaces, Deformation, Images, Defects (Materials), Aluminum, Plastics, Powder metals.
Identifiers: *Ultrasonic imaging, *Liquid surface levitation effect.

An ultrasonic image conversion cell utilizing the liquid surface levitation effect has been developed for nondestructive testing. This effect is based upon the principle that the surface of a free liquid will be deformed in accordance with the cross-sectional intensity distribution of an impinging ultrasonic beam. It can be coupled directly to an ultrasonically excited test specimen to obtain characteristic liquid-surface relief patterns depicting internal discontinuities. A significant advantage of the conversion cell is the fact that it does not require the test specimen itself to be immersed in a liquid. Also, because the conversion cell produces a real-time image, pulsed, frequency-modulated, and continuous wave modes of ultrasonic excitation can be used, and thus various types of ultrasonic images can be obtained. (Author)
AD-667 934 HC$3.00 MF$0.65

A STUDY OF THE VALIDITY OF GROUND-BASED SIMULATION TECHNIQUES FOR THE UH-1B HELICOPTER.
Bell Helicopter Co Fort Worth Tex
For primary bibliographic entry see Field 1C.
AD-667 988 HC$3.00 MF$0.65

STUDY, SURVEY OF HELICOPTER AND V/STOL AIRCRAFT SIMULATOR TRAINER DYNAMIC RESPONSE. VOLUME I. DYNAMIC RESPONSE CRITERIA FOR ROTARY WING AIRCRAFT FLIGHT TRAINERS.
Bell Aerosystems Co Buffalo N Y
For primary bibliographic entry see Field 1C.
AD-668 005 HC$3.00 MF$0.65

STUDY, SURVEY OF HELICOPTER AND V/STOL AIRCRAFT SIMULATOR TRAINER DYNAMIC RESPONSE. VOLUME II. DYNAMIC RESPONSE CRITERIA FOR V/STOL AIRCRAFT FLIGHT TRAINERS.
Bell Aerosystems Co Buffalo N Y
For primary bibliographic entry see Field 1C.
AD-668 006 HC$3.00 MF$0.65

NEWS OF INSTITUTIONS OF HIGHER LEARNING, NO. 5, 1966: SELECTED ARTICLES,
Foreign Technology Div Wright-Patterson AFB Ohio
For primary bibliographic entry see Field 11F.
AD-668 102 HC$3.00 MF$0.65

PERFORMANCE OF A 3.3-mm RADIOMETER.
Aerospace Corp El Segundo Calif Lab Operations
For primary bibliographic entry see Field 17B.
AD-668 108 HC$3.00 MF$0.65

INVESTIGATION OF A WIDE BAND NOISE GENERATOR.
Final rept. Mar 64-Feb 67,
Gruenzweig Und Hartmann A G Ludwigshafen Am Rhein (West Germany)
G. Kurtze, and F. Mechel. Mar 68, 39p
AFFDL-TR-67-88
Contracts AF 61 (052)-779, AF 61 (052)-931

Descriptors: (*Noise generators, Broadband), Shock waves, Energy conversion, Supersonic characteristics, Configuration, Noise.

Shock waves are generated by a displacement body rotating at the end of a rotor arm with supersonic velocity. The echoes of the shocks in a reverberant room build up a high-energy sound field with a broad and rather flat spectrum. Acoustic power up to 30 kW is generated with an efficiency of 23 percent. The measurement of the radiated acoustic power is described and the optimum shape and dimensions of the displacement body for good acoustic energy conversion are investigated. Design specifications for the rotor arm are given. (Author)
AD-668 132 HC$3.00 MF$0.65

AN ANALYSIS OF THE SPLIT HOPKINSON PRESSURE BAR,
Naval Ordnance Lab White Oak Md
For primary bibliographic entry see Field 20K.
AD-668 166 HC$3.00 MF$0.65

RESEARCH IN MATERIALS SCIENCE AND ENGINEERING.
Massachusetts Inst of Tech Cambridge
For primary bibliographic entry see Field 11G.
AD-668 215 HC$3.00 MF$0.65

IMPLOSION DRIVEN HYPERVELOCITY LAUNCHER PERFORMANCE USING GASEOUS DETONATION WAVES,
Toronto Univ (Ontario) Inst for Aerospace Studies
John D. Watson. Dec 67. 77p Rept no. UTIAS-TN-113
ARL-67-0278
Contract AF 33 (615)-2766

Descriptors: (*Hypervelocity guns, Performance (Engineering)), Detonation waves, Hydrogen, Oxygen, Helium, Hypervelocity projectiles, Shock waves, Combustion chambers, Deflagration, Explosive materials, Mixtures, Canada.
Identifiers: *Implosion launchers, *Hypervelocity launchers, Driver gases.

An experimental investigation of the performance of an Implosion-Driven Hypervelocity Launcher was made in preparation for the investigation of launcher performance using explosive liners. Initial gaseous mixtures of stoichiometric hydrogen and oxygen diluted with hydrogen or helium in the initial pressure range from 100 psi to 500 psi were used. The detonation velocities and the subsequent trajectories of the reflected shock waves in the hemispherical combustion chamber were determined for the various initial mixtures. The measured detonation velocities in this high-pressure range agree very well with theory. Gun performance for the various reservoir conditions was investigated and the performance utilizing imploding shock waves is compared to the performance using deflagrating or constant volume combustion. (Author)
AD-668 223 HC$3.00 MF$0.65

DESIGN AND ANALYSIS OF A STATISTICAL EXPERIMENT ON HIGH VOLTAGE BREAKDOWN IN VACUUM.
Technical rept.,
Army Electronics Command Fort Monmouth N J
M. M. Chrepta, M. H. Zinn, and G. W. Taylor.
Feb 68, 19p Rept no. ECOM-2939
ARPA Order-517

Descriptors: (*Failure (Electronics), Vacuum), Voltage, Statistical analysis, Radar equipment, Design, Ion accelerators, Space propulsion, Particle accelerators, Test methods, Electrodes, Geometry, Materials, Anodes, Cathodes.
Identifiers: Graphs (Charts).

The results of an experiment designed as a quarter replicate of a 2 to the 7th power plan on factors effecting high-voltage breakdown in vacuum are given. The significance of each of the seven factors is analyzed, showing the effect of electrode materials, electrode geometry, electrode finishes, and the bakeout process. A good degree of confidence was obtained showing that the anode material and anode geometry are important in the cause for breakdown. The results of these statistically designed experiments and other experiments performed investigating the activity in high-voltage gaps lead to the conclusion that anode effects play a major role in the breakdown process. Upon completion of the full line of designed experiments, the information gained from this work will be compiled in charts and graphs as a design monograph for the high-voltage high vacuum component design engineer. (Author)
AD-668 241 HC$3.00 MF$0.65

THERMO-MOLECULAR PRESSURE EFFECTS IN TUBES AND AT ORIFICES,
Advisory Group for Aerospace Research and Development Paris (France)
Max Kinslow, and George D. Arney, Jr. Aug 67, 66p Rept no. AGARD-ograph-119
Prepared in cooperation with ARO, Inc., Tullahoma, Tenn.

Descriptors: (*Pressure gages, Errors), (*Superaerodynamics, Pressure gages), Molecular properties, Thermal properties, Pressure, Pipes, Orifices, Knudsen number, Heat flux, Heat transfer.
Identifiers: *Thermo-molecular pressure, Thermal accomodation coefficients.

An investigation of the errors arising from thermal nonequilibrium in systems measuring gas pressures is presented. The errors are attributed to a phenomenon referred to as thermo-molecular pressure. This effect is investigated both theoretically and experimentally at sensing orifices and in tubes. A thorough review of the literature is given and a theory is developed for the error introduced in the limiting case of a very small sensing orifice with heat flux to the orifice surface. The theory takes into account the effect of arbitrary thermal accommodation coefficient at the orifice surface. Experimental data are presented separately for thermo-molecular pressures in tubes and at orifices. In addition, results of heat-transfer measurements in the transitional flow regime between flat plates are presented as a basis for correlating the orifice data. Finally, methods are given, with examples, for the correction of thermo-molecular effects both at orifices and in circular tubes. (Author)
AD-668 251 HC$3.00 MF$0.65

THE POTENTIAL USE OF MATHEMATICAL MODELS IN MATERIALS DATA PRESENTATION WITH PARTICULAR REFERENCE TO THE AGARD MATERIAL PROPERTIES HANDBOOKS,
Advisory Group for Aerospace Research and Development Paris (France)
A. G. R. Thomson. Oct 66, 39p Rept no. AGARD-510
NATO Furnished. Presented to the Structures and Materials Panel of AGARD Meeting (23rd), Paris, France, 4-12 Oct 66.

Descriptors: (*Materials, *Mathematical models), (*Creep, Experimental data), Handbooks, Tables, Thermal properties, Physical properties, Mechanical properties.

Creep data in the AGARD Material Properties Handbooks are reviewed and means are discussed of improving the scope and usefulness of the data. Ambiguities in the definitions of creep extension and other material properties and the need for consistency in the presentation of data are discussed. Advantages of using mathematical models for the correlation and presentation of various kinds of material properties data are considered. (Author)
AD-668 254 HC$3.00 MF$0.65

BASES OF GAS DYNAMICS AND THEIR APPLICATION TO THE CALCULATION OF SUPERSONIC WIND TUNNELS,
Foreign Technology Div Wright-Patterson AFB Ohio
For primary bibliographic entry see Field 20D.
AD-668 292 HC$3.00 MF$0.65

HYPERSONIC PITCH-DAMPING SUPPORT USING WATER-COOLED BALL BEARINGS.
Naval Ordnance Lab White Oak Md
For primary bibliographic entry see Field 20D.
AD-668 325 HC$3.00 MF$0.65

A SHARK-BITE METER,
Cornell Univ Ithaca N Y
For primary bibliographic entry see Field 6C.
AD-668 348 Not available from CFSTI.

THE USE OF A QUARTZ CONTAINED DISCHARGE IN ATOMIC TRITIUM EXPERIMENTS,
Harvard Univ Cambridge Mass Dept of Physics
B. S. Mathur. 30 Jan 67, 2p
Contract Nonr-1866 (19)
Availability: Published in The Review of Scientific Instruments, v38 n10 p1536 Oct 1967.

Descriptors: (*Tritium, *Gas discharges), Triton beams, Containers, Quartz, Discharge tubes, Radiofrequency, Hydrogen.

The rapid loss of tritium and the rapid evolution of hydrogen in the discharge has limited the accuracy of the previous atomic beam measurements with tritium. Because of the high activity of tritium, only a limited amount of tritium was recirculated. It is reported that the use of a quartz discharge bulb instead of a Pyrex bulb greatly reduces the loss of tritium as well as the evolution of hydrogen in the rf discharge.
AD-668 376 Not available from CFSTI.

SMALL SHIELDED THERMOCOUPLE TOTAL TEMPERATURE PROBES,
Technion - Israel Inst of Tech Haifa Dept of Aeronautical Engineering
Josef Rom, and Yigal Kronzon. Dec 67, 20p Rept nos. Scientific-6, TAE-79
Contract F61052-67-C-0033
See also Scientific rept. no. 3, AD-664 574.

Descriptors: (*Thermocouples, Design), (*Supersonic flow, Instrumentation), Calibration, Wake, Flow fields, Flow separation, Temperature, Mach number, Reynolds number, Shock waves, Mapping, Iron, Copper alloys, Nickel alloys, Israel.
Identifiers: Total temperature.

The design and the calibration of 2 mm and 3 mm O.D. shielded thermocouple total temperature probes are described. The 3 mm O.D. probe recovery factor is 0.985 plus or minus 0.005 and the 2 mm O.D. one is 0.975 plus or minus 0.005 up to flow Mach number of 3.5. The probe response is only slightly dependent of Reynolds number. By positioning of the thermocouple junction at the vent holes position its output becomes sensitive to disturbances, such as shock waves in the flow. This characteristic of the probe can be useful in mapping of discontinuities in complicated flow fields. (Author)
AD-668 466 HC$3.00 MF$0.65

AERODYNAMIC EXPERIMENT IN MACHINE BUILDING. CHAPTER II. WIND TUNNELS,
Foreign Technology Div Wright-Patterson AFB Ohio
I. L. Povkh. 21 Jul 67, 51p Rept no. FTD-MT-67-07
Edited machine trans. of mono. Aerodinamicheskii Eksperiment v Mashinostroenii, Moscow/Leningrad 1965 p40-68, 471-80.

Descriptors: (*Wind tunnels, Design), Aerodynamic characteristics, Wind tunnel nozzles, Shock tubes, Nozzle throats, Supersonic wind tunnels, USSR.
Identifiers: Shock tunnels, Translations, Gas dynamics.

Contents: Methods of the aerodynamic experiment; Continuous flow wind tunnels; Intermittent blow-down wind tunnels; Test section and nozzle of a supersonic tunnel; Shock tunnels.
AD-668 508 HC$3.00 MF$0.65

PRELIMINARY DESCRIPTION OF THE MODIFIED JPL 25-FT SPACE SIMULATOR.
Jet Propulsion Lab., Calif. Inst. of Tech., Pasadena.
M. J. Argoud. 1 Feb 67, 39p NASA-CR-93689, JPL-TM-33-319
Contract NAS7-100

Descriptors: *Measuring instruments, *Space environment simulation, *Spacecraft control, *Structural design, Space simulators, Test facilities.

For abstract, see STAR 06 10.
N68-19511 HC$3.00 MF$0.65

DESIGN, FABRICATION AND CALIBRATION OF SIX IRIDIUM VERSUS IRIDIUM-60 RODIUM THERMOCOUPLES FINAL REPORT.
Southern Research Inst., Birmingham, Ala.
For primary bibliographic entry see Field 20M.
For abstract, see STAR 06 10.
N68-19864 HC$3.00 MF$0.65

AUTOMATIC PRESSURE TRANSDUCER CALIBRATION SYSTEM.
National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
A. E. Schuler. 29 Nov 67, 13p NASA-TM-X-53678

Descriptors: *Calibrating, *Pressure sensors, *Reliability engineering, *Systems engineering, Data acquisition, Data processing equipment, Engineering drawings, Pressure regulators, Quality control, Systems analysis.

For abstract, see STAR 06 10.
N68-20044 HC$3.00 MF$0.65

FABRICATION OF THE 23-FT COLLIMATING MIRROR FOR THE JPL 25-FT SPACE SIMULATOR.
Jet Propulsion Lab., Calif. Inst. of Tech., Pasadena.
R. P. Eddy, and M. R. Heilig. 15 Dec 67, 27p NASA-CR-93792, JPL-TR-32-1214
Contract NAS7-100

Descriptors: *Fabrication, *Mirrors, *Space simulators, *Structural design, Aluminum coatings, Collimators, Optical properties, Solar simulators, Temperature control.

For abstract, see STAR 06 10.
N68-20261 HC$3.00 MF$0.65

SPURIOUS PRESSURE FLUCTUATIONS IN WIND TUNNELS.
National Physical Lab., Teddington (England). Aerodynamics Div.
J. A. Wills. 6 Jul 67, 14p NPL-AERO-1237, ARC-29265

Descriptors: *Pressure oscillations, *Wall pressure, *Wind tunnels, Data correlation, Exhaust diffusers, Low frequencies, Turbulent boundary layer, Unsteady flow, Wind tunnel walls.

For abstract, see STAR 06 10.
N68-20398 HC$3.00 MF$0.65

EXAMPLES OF NUMERICAL PRECISIONS IN THE RESOLUTION OF LINEAR SYSTEMS BY LEAST SQUARES METHOD.
Exemples de Precisions Numeriques Dans La Resolution de Systemes Lineaires Au Sens des Moindres Carres
Laboratoire de Recherches Balistiques Et Aerodynamiques, Vernon (France).
A. Desgardin. 8 Jan 68, 66p NT-2/EAS-E/1508
Lang- in French

Descriptors: *Computer programs, *Data processing, *Linear systems, *Matrices (mathematics), Algorithms, Fortran, Inversions, Least squares method, Problem solving, Wind tunnels.

For abstract, see STAR 06 10.
N68-20473 HC$3.00 MF$0.65

A PROPOSED ROCKET-BORNE PHOTOMETER.
Royal Aircraft Establishment, Farnborough (England).
For primary bibliographic entry see Field 4A.
For abstract, see STAR 06 10.
N68-20495 HC$3.00 MF$0.65

METALS CHARACTERIZATION BY LOW-TEMPERATURE THERMOELECTRIC METHODS,
National Bureau of Standards, Boulder, Colo.
For primary bibliographic entry see Field 11F.
PB-177 832 HC$3.00 MF$0.65

REPORT OF NRL PROGRESS.
Naval Research Lab., Washington, D. C.
Apr 68, 52p
Available on subscription at $15.00/per year domestic, and $18.00/per year foreign.

Descriptors: (*Naval research, Reports), (*Ionosphere, Scientific research), (*Metallography, Free energy), Chemistry, Electricity, Mathematics, Metallurgy, Aluminum alloys, Nuclear physics, Magnetic properties, Radio transmission, Satellite antennas, Solid state physics, Color centers, Sound.

Complete articles: Determination of absolute solid-liquid interfacial free energies in metals; and Some recent ionospheric investigations at Randle Cliff. Summaries are given of research in the following fields: chemistry, electricity, mathematics, metallurgy, nuclear and atomic physics, radio, solid state physics, and sound.
PB-177 877 HC$3.00 MF$0.65

VERNIER CALIPERS INSIDE, OUTSIDE, AND DEPTH DIMENSIONS TO 12 INCHES.
Bureau of Naval Weapons Representative, Pomona, Calif. Metrology Engineering Center.
For primary bibliographic entry see Field 9C.
PB-177 878 HC$3.00 MF$0.65

ESR SPECTROMETER FOR GASEOUS MEDIA. PART I. PRELIMINARY DESIGN,
California Univ., Berkeley. Lawrence Radiation Lab.
Kenneth W. Lamers. Oct 67, 65p
Contract W-7405-eng-48

Descriptors: (*Electron spin resonance, *Spectrometers), Gases, Hydrogen, Concentration (Chemistry), Microwave spectroscopy.

For abstract, see NSA 22 08.
UCRL-17306-pt-1 HC$3.00 MF$0.65

14C. Recording Devices

THE VIDEO TAPE RECORDINGS OF ULTRASONIC TEST INFORMATION,
Naval Ordnance Lab White Oak Md
Robert A. Youshaw, Charles H. Dyer, and Edward L. Criscuolo. 15 Feb 68, 21p Rept no. NOLTR-68-13

Descriptors: (*Ultrasonic radiation, *Magnetic recording systems), Magnetic tape, Transducers, Test methods, Welds, Coupling circuits, Oscilloscopes, Diagrams.

A video tape recorder has been converted into a wide band instrumentation recorder. The 'A' scan from the ultrasonic tester is directly recorded, together with the operator's voice giving the location, transducer position and interpretation of test data. An oscilloscope is used for the playback. The circuitry necessary to couple the output of the ultrasonic tester to the tape recorder is described. (Author)
AD-668 165 HC$3.00 MF$0.65

50-POINT TRAFFIC CENSUS-RESULTS FOR 1966,
Road Research Lab., Crowthorne (England).
J. B. Dunn. 1967, 40p RRL-LR119

Descriptors: (*Traffic, Statistical analysis), Vehicles, Numerical analysis, Roads, Rural areas, Urban areas, Recording systems, Punched tape, Meters, Analysis, Great Britain.

This report gives the results for 1966 of a traffic census which has been in progress, since January 1956, at 50 points on the trunk and classified roads of Great Britain. Motor vehicle mileage on these roads in 1966 is estimated to have been 6 per cent higher than in 1965, 50 per cent higher than in 1960 and 107 per cent higher than in 1956. The motor vehicle mileage on all motorways in 1966 is estimated from counts, and forming part of the 50-point census, to have been rather more than 3 per cent of that on all other roads.
PB-177 901 HC$3.00 MF$0.65

14D. Reliability

FOUNDATIONS OF RELIABILITY AND OPERATION THEORY FOR RADIOELECTRONIC EQUIPMENT,
Foreign Technology Div Wright-Patterson AFB Ohio
N. A. Shishonok, V. F. Repkin, and L. L. Barvinskii. 3 Oct 67, 730p Rept no. FTD-HT-67-154
Unedited rough draft trans. of mono. Osnovy Teorii Nadezhnosti i Ekspluatatsii Radioelektronnoi Tekhniki, Moscow, 1964 551p.

Descriptors: (*Electronic equipment, USSR), (*Reliability, Theory), Probability, Mathematical analysis, Simulation, Design, Operation, Maintenance, Redundant components, Protection, Standardization, Spare parts, Environment, Man-machine systems, Aging (Materials), Failure (Mechanics), Circuits, Structural properties, Handling, Approximation (Mathematics).
Identifiers: Translations.

This book treats basic problems of reliability theory and the operation of radioelectronic devices. The authors examine quantitative indicators of reliability and methods of their engineering calculation and statistical evaluation. Methods for basing demands upon reliability are discussed. Ways to increase reliability at the expense of reserving and to operate the apparatus efficiently are taken into account. The authors have considered the influence of preventive measures and repair operations on reliability. The influence of the control system's parameters on the reliability of the apparatus is also treated. Finally, the authors have dealt with problems concerning the efficiency of complex systems and methods for the simulation of their functioning processes which take reliability into account. The book is intended for university students taking courses in the principles of reliability. It can also be used by engineering and technical personnel who are engaged in the design, manufacture and operation of radioelectronic devices. (Author)
AD-668 250 HC$3.00 MF$0.65

ONE-ORDER-STATISTIC CONDITIONAL ESTIMATORS OF SHAPE PARAMETERS OF LIMITED AND PARETO DISTRIBUTIONS AND SCALE PARAMETERS OF TYPE II ASYMPTOTIC DISTRIBUTIONS OF SMALLEST AND LARGEST VALUES,
Aerospace Research Labs Wright-Patterson AFB Ohio
Albert H. Moore, and H. Leon Harter. Feb 68, 8p Rept no. ARL-68-0038
Availability: Published in IEEE Transactions on Reliability, vR-16 n3 p100-3 Dec 1967.

Descriptors: (*Reliability, Statistical analysis), Random variables, Confidence limits, Sampling, Statistical distributions, Life expectancy.
Identifiers: Asymptotic distributions, Maximum likelihood, Order statistics.

One-order-statistic estimators are derived for the shape parameter K of the limited distribution function F sub 1 (x, omega, K)=1- (omega-x) raised to the Kth power and the Pareto distribution function F sub 2 (y, epsilon, K)=1- (y-epsilon) raised

to the -Kth power, given the location parameters omega and epsilon, respectively.
AD-668 365 Not available from CFSTI.

LEAKAGE TESTING HANDBOOK.
General Electric Co., Schenectady, N. Y. Jet Propulsion Lab., Calif. Inst. of Tech., Pasadena.
J. W. Marr. Apr 68, 461p NASA-CR-952, S-67-1014
Contract NAS7-396
Coll- 461 P Refs Prep- Prepared for Jpl

Descriptors: *Flow theory, *Handbooks, *Leakage, *Tests, Chemical analysis, Detection, Flow characteristics, Fluid flow, Inspection, Isotopic labeling, Mass spectrometers, Seepage, Sonic anemometers, Test equipment, Tracers.

For abstract, see STAR 06 10.
N68-20389 HC$3.00 MF$0.65

THE RELIABILITY OF A SPACE VEHICLE LAUNCHER SYSTEM - A THEORETICAL APPROACH.
European Space Vehicle Launcher Development Organization, Paris (France).
For primary bibliographic entry see Field 22D.
For abstract, see STAR 06 10.
N68-20414 HC$3.00 MF$0.65

QUALITY CONTROL.
Agency for International Development, Washington, D. C. Communications Resources Div.
For primary bibliographic entry see Field 5C.
PB-177 957 HC$3.00 MF$0.65

14E. Reprography

RESEARCH IN CONTINUOUS TONE ELECTROPHOTOGRAPHY.
Final technical rept. 15 Apr-15 Oct 63.
American Zinc, Lead and Smelting Co., St. Louis, Mo.
15 Oct 63, 100p
Contract DA-44-009-AMC-189 (X)

Descriptors: (*Electrophotography, Photographic tone), (*Zinc compounds, Production), Oxides, Photoconductivity, Photographic materials, Photographic chemicals, Silicone plastics, Polyester plastics, Styrene plastics, Carbon black.
Identifiers: Zinc oxide.

This is a final report on a research study made to determine the feasibility of extending the continuous tone range of prints made by electrophotography. A pilot scale zinc oxide furnace is described and construction details are presented. Of the zinc oxide samples made, several are doped with copper, gallium, arsenic or phosphorous. Experimental procedures are described for the production of dry toners and liquid developers. Variables responsible for tonal quality are evaluated on the basis of choice or raw materials and influence of surfactants on the electrophoretic charge on the developer particles. (Author)
AD-438 024 HC$3.00

A STUDY OF LITHOGRAPHIC FOUNTAIN SOLUTIONS.
Final technical rept.,
Graphic Arts Technical Foundation Pittsburgh Pa
Charles Gramlich, and Ralph F. Bock. Sep 67, 33p
AERDL-67-7F
Contract DAAK02-67-C-0195

Descriptors: (*Lithography, Solutions), Propanols, Molecular isomerism, Surface-active substances, Evaporation, Colloids, Lubrication, Concentration (Chemistry), Test methods, Butanols, Safety, Glycols, Feasibility studies, Methanols, Ethanols, Transport properties.
Identifiers: Fountain solutions, Dampening systems.

Isopropanol is used in lithographic fountain solutions to reduce waste, attain ink/water balance more rapidly and allow pressmen greater latitude in operating the press. Isopropanol is volatile, and under certain conditions may yield hazardous conditions. The purpose of this project was to determine the chemical or physical function of alcohol and, if possible, to develop a fountain solution which does not have its objectionable features. (Author)
AD-667 896 HC$3.00 MF$0.65

IMAGE QUALITY EVALUATION BY OPTICAL ANALOG TRANSFORM TECHNIQUES.
Final rept. Jul-Nov 67,
Cornell Aeronautical Lab Inc Buffalo N Y
George H. Snider. Mar 68, 47p Rept no. CAL-VE-2491-0-1
RADC-TR-67-666
Contract F30602-67-C-0-1

Descriptors: (*Photographic intelligence, *Analog systems), (*Photographic images, *Photographic acutance), Aerial photographs, Analysis, Optical filters, Automata, Power spectra, Photographic contrast, Photographic grain, Correlation techniques, Photomultipliers.
Identifiers: *Optical analog transforms, Spatial filters.

This report presents the results of a novel method for quantitatively assessing the quality characteristics of reconnaissance photographs by optical analog transform techniques. The method is desirable because it is simple, objective, and amenable to automation. It involves placing reconnaissance photographs in the object plane of a spatial filtering apparatus and measuring the power levels in two spatial frequency regions. One region is in the middle frequencies where contrast and transfer function affect the power. The other region is in the high frequencies where granularity affects the power. The quotient of these powers (mid/high) is the quality measure. It is concluded that the method is useful when scene complexity is adequate and constant. Recommendations are made for improvements to the system to extend its usefulness to less complex scenes and possibly compare photographs of scenes of different complexity. (Author)
AD-668 123 HC$3.00 MF$0.65

HIGH-SPEED SURVEY OF PLASMA IN SOFT X-RAY AND ULTRAVIOLET REGION.
Foreign Technology Div Wright-Patterson AFB Ohio
For primary bibliographic entry see Field 20F.
AD-668 234 HC$3.00 MF$0.65

PHOTOGRAPHIC SCIENCE AND ENGINEERING, VOL. 12, NO. 1, JANUARY-FEBRUARY 1968.
Final rept.
Society of Photographic Scientists and Engineers Washington D C
Mar 68, 70p
AFOSR-68-0784
Contract AF 49 (638)-1713
Availability: hard copy available from Society of Photographic Scientists and Engineers, Suite 204, 1330 Massachusetts Ave., Washington, D. C. 20005. Price $3.00.

Descriptors: (*Photography, Symposia), Photographic materials, Electromagnetic waves, Integration, Iron compounds, Chromium compounds, Photochemistry, Silver compounds, Bromides, Zinc compounds, Oxides, Electrophotography, Japan, West Germany.

The journal includes the following papers which were presented at the Colloquium on Photographic Interaction Between Radiation and Matter: Photophysicochemical behavior of iron and chromium compounds; Analogous considerations of spectral sensitization of different photographic systems.
AD-668 297 Not available from CFSTI.

PHOTOGRAPHIC SCIENCE AND ENGINEERING, VOL. 11, NO. 2, MARCH-APRIL 1967.
Society of Photographic Scientists and Engineers Washington D C
1967, 76p
AFOSR-68-0781
Contract AF 49 (638)-1713
Availability: Hard copy available from Photographic Science and Engineering, 1330 Mass. Ave., N. W. Washington, D. C. 20005 $3.00.

Descriptors: (*Photography, Symposia), Scientific research, Interactions, Halides, Silver compounds, Electron microscopes, Photomicrography, Electromagnetic pulses, Absorption, Photographic techniques, High-speed cameras, Crystal structure, Abstracts, Reports.

The referenced journal contains articles presented at the 1966 meeting of the Society of Photographic Scientists and Engineers. The subject of the colloquium was the Photographic Interaction between Radiation and Matter. Radiation is restricted to the electromagnetic spectrum and matter is restricted to those materials which remember the interaction. The colloquium included both silver halide systems and non-silver halide systems. (Author)
AD-668 302 Not available from CFSTI.

PHOTOGRAPHIC SCIENCE AND ENGINEERING, VOL. 11, NO. 3, MAY-JUNE 1967.
Society of Photographic Scientists and Engineers Washington D C
Mar 68, 94p
AFOSR-68-0782
Contract AF 49 (638)-1713
Availability: Hard copy available from Society of Photographic Scientists and Engineers, 1330 Mass. Ave., N. W., Washington, D. C. 20005 $3.00.

Descriptors: (*Photography, Symposia), Photographic materials, Electromagnetic waves, Interactions, Dyes, Molecular energy levels, Photographic emulsions, Electrophotography, Electrostatics, Silver compounds, Bromides, Single crystals, Alkali metal compounds, Halides, Radiation damage, Carriers (Semiconductors), Photographic images, Photochemistry, Japan, West Germany, Switzerland.
Identifiers: Silver chloride, Silver bromide, Photoreversible photography.

The journal includes the following papers which were presented at the Colloquium on Photographic Interaction Between Radiation and Matter: Calculation of the electronic energy levels of various photographic sensitizing and desensitizing dyes in emulsions; On the mechanism of the charging and discharging of zinc oxide-resin layers in the dark and under illumination; Quantum efficiency studies on silver bromide single crystals and the effect of dye concentration on the efficiency of spectral sensitization; Radiation damage in alkali and silver halides; The trapping of holes in the interior and at the surface of AgBr single crystals; Latent-image fading and the function of gelatin in the silver halide system; Photoreversible photographic system.
AD-668 303 Not available from CFSTI.

PHOTOGRAPHIC SCIENCE AND ENGINEERING. VOLUME 11 NUMBER 4, JULY-AUGUST 1967.
Society of Photographic Scientists and Engineers Washington D C
Mar 68, 80p
AFOSR-68-0783
Contract AF 49 (638)-1713
Availability: Hard copy available from Society of Photographic Scientists and Engineers. 1330 Massachusetts Avenue, N. W., Washington, D. C. 20005. Price $3.00.

Descriptors: (*Photography, Symposia), Photographic materials, Electromagnetic waves, Interactions, Dyes, Fluorescence, Silver compounds, Halides, Monomolecular films, Transport properties, Photographic images, West Germany, Switzerland.
Identifiers: Diethyl cyanines, Silver chloride, Silver bromide, Latent images.

The journal includes the following papers which were presented at the Colloquium on Photographic Interaction Between Radiation and Matter: The luminescent properties of 1,1'-diethyl-2,2'-cyanine alone and adsorbed to silver halides; Transfer of energy and electrons in assemblies of monolayers; Note on mechanism of latent-image formation.
AD-668 304 Not available from CFSTI.

MULTISPECTRAL PHOTOGRAPHIC STUDIES OF A RED-BED FACIES, MINAS BASIN, NOVA SCOTIA.
Air Force Cambridge Research Labs L G Hanscom Field Mass
For primary bibliographic entry see Field 8G.
AD-668 438 HC$3.00 MF$0.65

A STUDY TO DETERMINE THE OPTIMUM DESIGN OF A PHOTOGRAPHIC FILM FOR THE LUNAR SURFACE HAND-HELD CAMERA FINAL REPORT.
Edgerton, Germeshausen and Grier, Inc., Bedford, Mass. Systems Inc.
J. C. Mc Cue, and C. W. Wyckoff. 2 Jun 65, 161p NASA-CR-92015, B-3076
Contract NAS9-3613

Descriptors: *Cameras, *Lunar photography, *Manual control, *Photographic film, Optical equipment, Optimization, Photographic developers, Photographic equipment, Photographic recording, Production engineering, Structural analysis.

For abstract, see STAR 06 10.
N68-19742 HC$3.00 MF$0.65

EXPLORING IN AEROSPACE ROCKETRY. 14-ROCKET LAUNCH PHOTOGRAPHY.
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
W. A. Bowles. 1968, 14p NASA-TM-X-52401

Descriptors: *Photographic equipment, *Rocket launching, Ground support equipment, Launching sites, Photographic film.

For abstract, see STAR 06 10.
N68-19835 HC$3.00 MF$0.65

HOLOGRAPHY OF MOVING OBJECTS.
Holographie des Objets en Mouvement
Institut Franco-allemand de Recherches, St. Louis (France).
P. Smigielski. 1966, 11p ISL-T-13/66
Lang- in French

Descriptors: *Holography, *Photographic recording, *Structural vibration, *Vibration effects, Imagery, Motion pictures, Photogrammetry, Quality control, Structural members.

For abstract, see STAR 06 10.
N68-20318 HC$3.00 MF$0.65

ELECTRONOPTICAL SYSTEMS FOR RECORDING HIGH-SPEED PROCESSES.
Lockheed Missiles and Space Co., Palo Alto, Calif.
Yu. E. Nesterikhin, and R. I. Soloukhin. 1967, 22p
Trans. of mono. Methods of High-Speed Measurement in Gasdynamics and Plasma Physics, Moscow 1967 p88-106.

Descriptors: (*Solar radiation, High-speed photography), (*Electron optics, Photographic recording systems), Photographic techniques, Gases, Line spectrum, Resolution, Photographic images, Circuits, Scanning, High-speed cameras, Scintillation, Intensity, Motion picture cameras, Optical properties, Sensitivity, Exposure.
Identifiers: Converters.

The majority of the high-speed processes which are of interest in modern physics is not accompanied by powerful radiation to facilitate their photographic recording as, for example, are strong point discharges in gases under high pressure, explosions, combustion, etc. High speed moving picture cameras with large aperture ratio and high time resolution are needed for exposure and scanning of radiation spectra, investigations of the dynamics of high-temperature plasmas, exposure of processes in the light of individual spectrum lines, scintillation radiation, initial phases of breakdown and others, including non-self-illuminating phenomena. Such instruments should have a broad spectrum sensitivity, should assure accurate synchronization with the process under investigation, should record the phenomena in different regimes, say the frame-by-frame exposure or time-scanning image modes. It is difficult or even impossible to satisfy these demands by utilizing mechanical optical systems, while the development of the necessary electron-optical units with appropreate control circuits is completely realizable. The very low inertia (up to 10 to the minus 14th power sec) of electron-optical converters, the possibility of a flexible control, the comparatively large frame size with high resolution, and the absence of moving parts assure wide application in investigations of various high-speed processes. (Author)
PB-176 848T HC$3.00 MF$0.65

THE UTILITY OF SATELLITE CLOUD PHOTOGRAPHS IN OBJECTIVE ANALYSIS OF THE 500-MB HEIGHT FIELD.
Michigan Univ., Ann Arbor. Dept. of Meteorology and Oceanography.
For primary bibliographic entry see Field 4B.
PB-177 880 HC$3.00 MF$0.65

SILK SCREEN PRINTING ON TEXTILES.
Technical inquiry service.
International Cooperation Administration, Washington, D. C. Office of Industrial Resources.

Jul 60, 41p
Prepared in cooperation with Mayer (Frank) Engineering Co., Los Angeles, Calif.

Descriptors: (*Textiles, *Printing), Fibers (Natural), Fibers (Synthetic), Dyes, Costs, Labor, Industrial equipment, Colors, Industrial plants.

Silk screen printing varies in complexity from a simple operation to a highly scientific art. If confined to the use of pigmented dyes, a satisfactory product can be produced for cottage industry with a minimum of equipment and without the need of highly trained and skilled color chemists and special equipment for dye setting and aging. It is basically a service industry since no product is produced; instead printing is done to supply the needs of other manufacturers for decoration of their products. One thousand to twelve hundred yards of material can be printed on five tables by six people in one eight-hour shift. (Author)
PB-177 946 HC$3.00 MF$0.65

15. MILITARY SCIENCES

15B. Chemical, Biological, and Radiological Warfare

STORAGE STABILITY OF CIVIL DEFENSE SHELTER RATIONS.
Annual rept. no. 5, 21 Jun 66-20 Jun 67.
Georgia Experiment Station Experiment
S. R. Cecil, and J. G. Woodroof. Dec 67, 93p
USA-NLABS-68-26-GP
Contract DA-19-129-QM-2050 (N)

Descriptors: (*Civil defense systems, *Shelters), (*Food, Storage), Materials, Cereals, Moisture, Carbohydrates, Fiberboard, Containers, Bread, Oxygen, Flexural strength, Leakage (Fluid), Corrosion, Defects (Materials), Survival, Aging (Materials), Acceptability, Wheat.
Identifiers: *Protective coatings.

Results are reported on the stability of ten lots of fallout shelter cereal rations stored for 4 years and 3 lots of carbohydrate supplement stored for 3 years at 100F/80% r.h., 100 degrees/57%, 70 degrees/80%, 70 degrees/57%, 40 degrees/57%, and 0 degrees/ambient r.h. Rations include 4 lots of survival crackers, 4 lots of survival biscuits, 2 lots of bulgur wheat wafers, and 3 lots of mixed lemon and cherry flavored hard candies. Data include 48-month and 36-month values, respectively, for (1) bursting strength, moisture content, and general conditions of V3c fiberboard cases; (2) residual oxygen, leaking, corrosion, and coating defects of 2-1/2-gallon and 5-gallon metal cans; (3) breakage and general condition of package seals, seams and materials, and product units; (4) fracture strength, peroxides, and free fatty acids of wheat products; (5) pH and sugar contents of carbohydrate supplements; and (6) moisture content, color, sensory quality, and hedonic ratings for all products. Results of all examinations of stored rations, initially and through 36 and 48 months, are discussed. (Author)
AD-667 932 HC$3.00 MF$0.65

CBE FACTORS MONTHLY SURVEY NO. 24.
Library of Congress Washington D C Aerospace Technology Div
1968, 235p Rept no. ATD-68-51-50-6
Survey series on Chemical, Biological, and Environmental Factors. See also Monthly Survey 23, AD-667 352.

Descriptors: (*Chemical warfare agents, Reviews), (*Biological warfare agents, Reviews), (*Environment, Reviews), Pesticides, Herbicides, Fertilizers, Hallucinogens, Bacteria, Viruses, Epidemiology, Aerosols, Ecology, Micrometeorology, Soils, USSR, Eastern Europe, China.

The report is the twenty-fourth in a series of monthly surveys covering the following areas: Chemical factors--pesticides, herbicides, fertilizers, psychotomimetics, other chemicals; Biological factors--pathogens; Environmental factors--aerosols, ecology, micrometeorology, soil science.
AD-668 075 HC$3.00 MF$0.65

THE SPASMOLYTIC ACTION OF NEMICOL-5 (I),
Joint Publications Research Service, Washington, D. C.
For primary bibliographic entry see Field 6T.
JPRS-43953 HC$3.00 MF$0.65

15C. Defense

SOCIAL SCIENCE RESEARCH AND NATIONAL SECURITY.
Smithsonian Institution, Washington, D. C.
Ithiel de Sola Pool. Mar 63, 261p
Contract Nonr-1354 (08)

Descriptors: (*Social sciences, *National defense), Research program administration, Military organizations, Government employees, War potential, Nuclear warfare.

'How can a branch of social science be produced which takes upon itself a responsible concern for national security matters, and how can talented individuals from within social science be drawn into this area'. The authors assume that the first step in the deliberate creation of a branch of

applied science is to describe some, at least, of the substantive tasks of the potential clientele (in this case the members of the national security establishment) and to suggest how successful research, both basic and applied, could assist them in performing these tasks. A second step is to draw the attention of the potential clientele and the potential practitioners of such a science to its potential for application in the hope that more individuals will participate in its growth. Later steps are to develop institutions dedicated to the creation of a self-conscious, self-stimulating branch of science; to supply funds; and to persuade many practitioners to practise, many clients to use the science. In this book we address ourselves to the first two of these steps. Our prime audience is intended to include, on the one hand, those research-oriented members of the military establishment (and related governmental agencies) who engage in strategic policy planning and, on the other hand, those social scientists who have special techniques to supply tested new concepts and information needed for more effective policy planning in the future.
AD-437 464 HC$3.00

EOC DISPLAY SYSTEM EVALUATION.
Technical memorandum,
System Development Corp Santa Monica Calif
Robert J. Miller. 16 Aug 67, 187p Rept no. TM-3832
Prepared in cooperation with Stanford Research Inst., Menlo Park, Calif.

Descriptors: (*Civil defense systems, Display systems), Automatic, Human engineering, Urban areas, Civilian personnel, Data transmission systems, Decision making, Models (Simulations), Performance (Engineering), Nuclear warfare, Radiation hazards, Earthquakes, Floods, Man-machine systems, Effectiveness, Digital systems, Control panels.
Identifiers: Emergencies, Riots, EOC (Emergency Operating Center), *Emergency operating centers.

This document presents the results of the investigation of the value of semiautomated display systems for emergency operations at the municipal level. The evaluation consisted of two phases: Phase I was directed toward determining the value of semiautomated displays for municipal executives in their emergency decision making using a model semiautomatic display system in a simulated emergency operations context. Phase II was a human engineering investigation of the operator and viewer interface with the model display system, to identify those design changes that should be incorporated if Phase I indicated that a semiautomatic system was desirable. The findings of these two phases are presented, together with a discussion of the value of semiautomatic displays at the local level, the required characteristics of displays for municipal-level EOCs, and the value of fully-automatic systems at the local, state and regional levels. (Author)
AD-667 964 HC$3.00 MF$0.65

THE LAW OF THE ROCKET SERVICE.
Foreign Technology Div Wright-Patterson AFB Ohio
N. I. Krylov. 29 Jun 67, 10p Rept no. FTD-HT-67-207
Edited trans. of Krasnaya Zvezda (USSR) n24 p2 28 Jan 67.

Descriptors: (*Armed forces (Foreign), USSR), (*Guided missiles (Surface-to-surface), Combat readiness), Guided missile personnel, Military personnel, Training, Military intelligence, Military publications, Newspapers, Propaganda, Simulators.
Identifiers: Translations.

A military newspaper item by the Commander-in-Chief of Strategic Rocket Forces mainly a propaganda piece extolling the combat readiness of his command, and citing the fact that all missions assigned by the Ministry of Defense for 1966 have been accomplished. Unit commanders named are Toroshin, Kizbashev, and Moryakov. Toroshin's unit received the Red Banner of the Military Council of the Rocket Forces. The article indicates that his command encompasses those forces whose rockets are fired from launching sites of a permanent nature and that they possess nuclear weapons. Compared to other branches of the armed forces, most of the training is conducted by means of simulator trainers rather than an actual equipment.
AD-668 063 HC$3.00 MF$0.65

OPERATIONAL ANALYSIS OF TIME - FREQUENCY COLLISION AVOIDANCE SYSTEMS,
Boeing Co Renton Wash Commercial Airplane Div
For primary bibliographic entry see Field 1B.
AD-668 163 HC$3.00 MF$0.65

AN ANALYSIS OF ROOF WASHDOWN VERSUS APPLIED SHIELDING AS A FALLOUT COUNTERMEASURE,
Stanford Research Inst Menlo Park Calif
For primary bibliographic entry see Field 13M.
AD-668 220 HC$3.00 MF$0.65

15D. Intelligence

EVALUATION OF POINTING TO A SHARP EDGE.
Technical rept. (Final), Mar 66-Dec 67,
Washington Univ Seattle Dept of Civil Engineering
J. E. Colcord, and Kenneth Lund. Apr 68, 72p
Contract DA-44-009-AMC-1492 (x)

Descriptors: (*Photogrammetry, Measurement), (*Photointerpreters, *Visual acuity), (*Stereoscopic projectors, Indicator lights), Photointerpretation, Performance (Human), Targets, Illumination, Accuracy, Psychophysics, Comparators, Stereoscopes, Stereoscopic map plotters, Aerial photographs, Photographic intelligence, Statistical analysis.
Identifiers: Metrology, Pointing (Positioning), Edges, Spatial perception.

The report includes the design of an apparatus to measure the ability of observers to point on a sharp black white edge at a standard test distance of 6 meters to a least count of better than 0.1 second of arc. The parameters measured were the size of circular measuring marks, illumination, and occular openings. The results show the effect of these variables on the task, the optimum design parameters, and point out the wide variability in absolute observer performance in both tangent and center settings. The general results suggest a standard deviation of about 10 seconds of arc on the average at optimum conditions. (Author)
AD-668 260 HC$3.00 MF$0.65

15E. Logistics

GROUND IMPACT SHOCK MITIGATION DRIVE-OFF SYSTEM DEVELOPMENT CARGO TRUCK, 3/4-TON M37.
Technical rept.,
Texas Univ Austin Engineering Mechanics Research Lab
David G. Wiederanders. 31 Jul 67, 28p Rept no. EMRL-TR-1028
USNA-LABS-TR68-48-AD
Contract DA-19-129-AMC-582 (N)

Descriptors: (*Air drop operations, Cargo vehicles), (*Cargo vehicles, *Impact shock), Impact tests, Test methods, Damage assessment, Honeycomb cores, Sandwich construction, Design, Optimization, Velocity, Load distribution, Hoists, Armed forces supplies.
Identifiers: *Cushioning systems, M-37 Vehicles (3/4-Ton), Drive-off capability.

Eight drops involving the M37 3/4-ton truck have been made in the velocity range from 15 to 28 fps, at design accelerations ranging from 17.5 to 30g. The cushioning system used for each drop is described and the damage sustained by the vehicle is discussed. It is concluded that the cushioning system developed in this series of tests provides adequate protection in the velocity range investigated and also provides a drive-off capability for the vehicle. The final cushioning system is described in detail and its effectiveness under some of the conditions that might be encountered in actual field drops is evaluated. (Author)
AD-667 937 HC$3.00 MF$0.65

GROUND IMPACT SHOCK MITIGATION CARGO TRAILER M101, 3/4-TON,
Texas Univ Austin Engineering Mechanics Research Lab
David G. Wiederanders. Jul 67, 39p Rept no. EMRL-TR-1025
USA-NLABS-TR-68-51-AD
Contract DA-19-129-AMC-582 (N)
Report no. 3, on High Velocity Dropping of Military Vehicles.

Descriptors: (*Air drop operations, *Cargo vehicles), (*Trailers, *Impact shock), Impact tests, Test methods, Damage assessment, Design, Optimization, Honeycomb cores, Sandwich construction, Load distribution, Hoists, Velocity, Armed forces supplies, Shock resistance.
Identifiers: M-101 Trailers (3/4-Ton), *Cushioning systems.

The present investigation and test series involving the M101 3/4-ton cargo trailer has consisted of five drops of the vehicle at impact velocities ranging from 25.4 fps, for the initial drop, to 55 fps for the fifth and final drop of the series. During the series, the design impact acceleration was varied from 20-30g. The cushioning system used for each drop of the series is described and the damage sustained by the vehicle during that drop is discussed. It is concluded that this vehicle can be dropped at impact velocities up to 50 fps without any damage, if a properly designed cushioning system is employed to dissipate the energy of the drop. Recommendations for improvements, from the air-drop standpoint, in the design of the vehicle, are included. (Author)
AD-667 938 HC$3.00 MF$0.65

GROUND IMPACT SHOCK MITIGATION CARGO TRUCK, 3/4-TON M37,
Texas Univ Austin Engineering Mechanics Research Lab
D. G. Wiederanders, W. L. Guyton, and E. A. Ripperger. 12 Dec 66, 58p Rept no. EMRL-TR-1011
USA-NLABS-TR-68-49-AD
Contract DA-19-129-AMC-582 (N)

Descriptors: (*Air drop operations, Cargo vehicles), (*Cargo vehicles, *Impact shock), Honeycomb cores, Sandwich construction, Design, Test methods, Damage assessment, Impact tests, Shock (Mechanics), Armed forces supplies, Velocity, Optimization, Shock resistance, Structural properties, Hoists.
Identifiers: *Cushioning systems, M-37 Vehicles (3/4-Ton).

Seven drops of the M37 3/4-ton truck have been made at impact velocities up to 56 fps, and at design accelerations as high as 30g. The cushioning system used for each drop is described and the damage sustained by the vehicle is discussed. It is concluded that this vehicle can be dropped at impact velocities up to 50 fps without any damage, if a properly designed cushioning system is used. Recommendations for improvements, from the aerial delivery standpoint, in the design of the vehicle are included. A detailed description is given of the procedure that should be followed in the design of a cushioning system. (Author)
AD-667 939 HC$3.00 MF$0.65

GROUND IMPACT SHOCK MITIGATION HOWITZER 105MM M2A1,
Texas Univ Austin Engineering Mechanics Research Lab
David G. Wiederanders. Jul 67, 28p Rept no. EMRL-TR-1020

USA-NLABS-TR-68-50-AD
Contract DA-19-129-AMC-582 (N)

Descriptors: (*Air drop operations, Howitzers), (*Howitzers, *Impact shock), Impact tests, Test methods, Damage assessment, Design, Optimization, Honeycomb cores, Sandwich construction, Velocity, Load distribution, Hoists, Tires, Pressure, Armed forces supplies.
Identifiers: *Cushioning systems.

The 105mm Howitzer supplied to this laboratory by the Army Tank and Automotive Command through arrangements made with Natick Laboratories has been dropped five times at impact velocities up to 54.4 fps, and at design accelerations as high as 30g. The initial modifications of the vehicle in preparation for the drop series and the design criterion for this test series are presented along with a description of the chshioning system used and the damage sustained in each drop. It is concluded that this vehicle can be dropped at impact velocities up to 50 fps without any damage, if a properly designed cushioning system is used. (Author)
AD-667 940 HC$3.00 MF$0.65

THE ROLE OF MTMTS IN EXPORT CONTROL OF CARGO,
Military Traffic Management and Terminal Service Washington D C
S. Tanner, and W. E. Hassenger. 5 May 67, 18p
Prepared for presentation at the AMC Customer Assistance Conference, 3-5 May 67.

Descriptors: (*Armed forces transportation, Management planning), (*Cargo, Armed forces transportation), Department of Defense, Management control systems, Logistics, Air transportation, Shipping (Marine), Military requirements, Reviews.

The design for MTMTS stems from the comprehensive JCS Port and Terminal Study conducted during the summer of 1964. This work with its conclusions and recommendation forms the basis for the establishment of a single manager for military traffic management, land transportation and common user ocean terminals. The conceptual thrust emanating from this effort was that MTMTS would be the single element in the Department of Defense to provide the essential interface between the logistics planner or operational shipper and the transportation means. (Author)
AD-667 997 HC$3.00 MF$0.65

CALCULATION OF EXPECTED DEPLETION TIME WHEN DEMAND IS STUTTERING POISSON.
Technical note,
Army Logistics Management Center Fort Lee Va Amc Inventory Research Office
W. Karl Kruse, and Edward Bruckner. 9 Apr 68, 8p

Descriptors: (*Inventory control, Mathematical models), Stock level control, Management planning, Military requirements, Decision making, Army procurement, Probability, Statistical distributions, Random variables, Logistics.
Identifiers: Poisson distributions, Depletion time.

A derivation of the expected depletion time of an initial value of stock is presented when demand is governed by the stuttering Poisson distribution. The derivation is simplified by the application of an infrequently used formula for the calculation of the expected value of a random variable. (Author)
AD-668 002 HC$3.00 MF$0.65

THE OPTIMUM EXTENT OF ICP INVENTORY CONTROL.
Logistics Management Inst Washington D C
Oct 67, 62p
Contract SD-271

Descriptors: (*Data processing systems, Inventory control), (*Inventory control, Optimization), Stock level control, Cost effectiveness, Decision making, Management planning, Government procurement, Armed forces supplies, Mathematical models.

The report concerns a supply system consisting of retail stock points supplying customers, wholesale stock points supplying the retail stockpoints, and an inventory control point (ICP) which maintains perpetual inventory records of wholesale stocks only. The problem is to determine if a particular retail stockpoint should report to the ICP its issues, receipts, and balance on hand of a particular inventory item, and, if so, how frequently to report them. The recommended mathematical solution is one which maximizes the excess of benefits (primarily a reduction of wholesale level safety stocks) over costs of data processing and transmission, considering the system as a whole. The solution indicates that an item might be reported daily by some retail stockpoints, less frequently by others, and not at all in some cases. The decision would be made at the ICP, but by a screening method at the retail stockpoints many items would be eliminated from consideration at the ICP. (Author)
AD-668 019 HC$3.00 MF$0.65

A CONTINUOUS INVENTORY PROBLEM.
Naval Research Lab Washington D C
For primary bibliographic entry see Field 13J.
AD-668 167 HC$3.00 MF$0.65

BOUNDS FOR MAXIMAL TEMPORALLY REPEATED FLOWS IN A NETWORK.
George Washington Univ Washington D C Logistics Research Project
For primary bibliographic entry see Field 12B.
AD-668 174 HC$3.00 MF$0.65

GENERAL SERVICES ADMINISTRATION FEDERAL SUPPLY SERVICE,
General Services Administration Washington D C
Anthony V. Anzalone. 1967, 21p
resented to AMC Customer Assistance Conference 3-5 May 1967.

Descriptors: (*Logistics, United States Government), Government procurement, Management planning, History, Buildings, Efficiency, Inventory, Effectiveness, Warehouses, Symposia.
Identifiers: General Services Administration.

Outlines the organization and operation of the Federal Supply Service of the General Services Administration.
AD-668 228 HC$3.00 MF$0.65

TRANSPORTATION SCHEDULING UNDER MULTI-DIMENSIONAL DEMANDS.
Research rept.,
Massachusetts Inst. of Tech., Cambridge. Dept. of Civil Engineering.
J. W. Devanney, III. 16 Dec 67, 73p R67-72
Contract C-85-65

Descriptors: (*Transportation, Scheduling), Algorithms, Statistical data, Cost effectiveness, Civil engineering, Operations research, Mobility, Economics.

This report describes an algorithm for scheduling passenger transportation systems under the realization that travel demand will both vary with time of day and depend on the schedule. The control variables used are the number of departures per day on each link, the times of these departures, and the number of units dispatched at each departure. The algorithm uses a combination of dynamic programming and heuristic search to generate scheduling policies which attempt to balance the demand attracted and served against the costs of attracting and serving this demand in a manner consistent with the system's objective. The algorithm can accept a wide variety of demand models and objective functions and may be feasibly applied to networks containing several hundred links.
PB-177 527 HC$3.00 MF$0.65

TUNNELING, THE STATE OF THE ART,
Mayo (Robert S.) and Associates, Lancaster, Pa.
For primary bibliographic entry see Field 13M.
PB-178 036 HC$3.00 MF$0.65

15G. Operations, Strategy, and Tactics

ON DISTRIBUTED COMMUNICATIONS. I. INTRODUCTION TO DISTRIBUTED COMMUNICATIONS NETWORKS,
RAND Corp., Santa Monica, Calif.
For primary bibliographic entry see Field 17B.
AD-444 830 HC$3.00

U. S. ARMY HANDBOOK OF COUNTERINSURGENCY GUIDELINES FOR AREA COMMANDERS: AN ANALYSIS OF CRITERIA,
American Univ., Washington, D. C. Special Operations Research Office.
M. D. Havron, J. A. Whittenburg, and A. T. Rambo. Jan 66, 320p

Descriptors: (*Counterinsurgency, Handbooks), Standards, Leadership, Decision making, Military requirements, Management planning, Communists, Sabotage, Logistics, Operations research, Political science, Strategic warfare, Military strategy.
Identifiers: Area security.

This report describes the exploratory efforts to develop basic concepts for formulating and interpreting criteria pertinent to the counterinsurgency at the operational area level. It elaborates the role of the area commander with emphasis on decision-making functions, alternatives and guidelines for his evaluation. Although a great deal of work remains to be done in counterinsurgency criteria development, this report is a first step. One which specifies immediate problems as well as directions for future effort. (Author)
AD-478 301 HC$3.00 MF$0.65

MOBILITY FOR COUNTERINSURGENCY WARFARE IN THAILAND,
Military Research and Development Center Bangkok (Thailand)
Peter Kostoff, and Sorasan Bhangsbha. 1968, 30p

Descriptors: (*Counterinsurgency, Thailand), Cargo vehicles, Tracked vehicles, Mobility, Insurgency, Trafficability, Environmental tests, Roads, Terrain, Plants (Botany), Photographs, Army operations, Military requirements.

The intent of this paper is to establish an appreciation of the surface mobility requirements for counterinsurgency operations in the environment of Thailand expressed in the form of vehicle characteristics. These characteristics are derived primarily from the results of four years of field tests conducted as a part of the Mobility Program sponsored jointly by the Office of the Secretary of Defense Advanced Research Projects Agency and Thailand's Military Research and Development Center. Communist activities in Thailand and the role of the counterinsurgent forces are also included for consideration from the standpoint of operational requirements. (Author)
AD-667 927 HC$3.00 MF$0.65

GROUND IMPACT SHOCK MITIGATION DRIVE-OFF SYSTEM DEVELOPMENT CARGO TRUCK, 3/4-TON M37.

Texas Univ Austin Engineering Mechanics Research Lab
For primary bibliographic entry see Field 15E.
AD-667 937 HC$3.00 MF$0.65

GROUND IMPACT SHOCK MITIGATION CARGO TRAILER M101, 3/4-TON,
Texas Univ Austin Engineering Mechanics Research Lab
For primary bibliographic entry see Field 15E.
AD-667 938 HC$3.00 MF$0.65

GROUND IMPACT SHOCK MITIGATION CARGO TRUCK, 3/4-TON M37,
Texas Univ Austin Engineering Mechanics Research Lab
For primary bibliographic entry see Field 15E.
AD-667 939 HC$3.00 MF$0.65

GROUND IMPACT SHOCK MITIGATION HOWITZER 105MM M2A1,
Texas Univ Austin Engineering Mechanics Research Lab
For primary bibliographic entry see Field 15E.
AD-667 940 HC$3.00 MF$0.65

NEW REGULATIONS REGARDING THE EQUIPMENT OF THE ARMED FORCES OF THE USSR,
Foreign Technology Div Wright-Patterson AFB Ohio
For primary bibliographic entry see Field 5I.
AD-668 017 HC$3.00 MF$0.65

UNDERWATER WORK MEASUREMENT TECHNIQUES: INITIAL STUDIES.
Technical rept.,
California Univ Los Angeles Biotechnology Lab
Gershon Weltman, Glen H. Egstrom, Robert E. Elliott, and Herbert S. Stevenson. Mar 68, 105p
Rept nos. TR-44, 68-11
Contract N00014-67-A-0111-0007

Descriptors: (*Performance (Human), Underwater), (*Diving, Performance (Human)), Biometry, Data processing systems, Effectiveness, Construction, Models (Simulations), Research program administration, Test methods, Classification, Closed circuit television, Recording systems, Arms, Legs, Stress (Physiology), Respiration, Electrocardiography, Space environmental conditions, Stress (Psychology), Ocean bottom, Tables.
Identifiers: Work measurement (Underwater), Graphs (Charts).

The report reviews initial progress in an ongoing study of underwater work measurement. The objective of the study is to determine new ways of defining and measuring diver work effectiveness, and to develop measurement techniques for general application in research and operational programs. Examination of measurement techniques was divided into three main areas: procedural, physiological and psychological. The report describes the development of a pipe construction task and a laboratory bioinstrumentation system. In addition, it presents the results of a series of sub-studies dealing with work methodology and physiological response underwater. The studies were conducted in the diving tank of the UCLA Underwater Research Facility. A summary of findings and recommendations is included. (Author)
AD-668 180 HC$3.00 MF$0.65

WORK PROGRAM FISCAL YEAR 1968.
American Univ Washington D C Center for Research in Social Systems
For primary bibliographic entry see Field 5K.
AD-668 268 HC$3.00 MF$0.65

16. MISSILE TECHNOLOGY

16B. Missile Trajectories

A DATA REDUCTION TECHNIQUE FOR METEOROLOGICAL WIND DATA ABOVE 30 KILOMETERS,
Atmospheric Sciences Lab White Sands Missile Range N Mex
E. P. Avara, and B. T. Miers. Dec 67, 29p
ECOM-5168

Descriptors: (*Sounding rockets, Impact prediction), (*Wind, Upper atmosphere), (*Guided missile trajectories, Predictions), Guided missile ranges, Exterior ballistics, Rocket trajectories, Atmospheric temperature, Barometric pressure, Thickness, Military requirements, Stratosphere, Parachutes, Spheres, Radar tracking, Sensors, Corrections, Mathematical analysis.
Identifiers: *Ballistic meteorology, FPS-16 radar.

The FPS-16 tracking systems superimpose undesired oscillations on the real position data resulting in rapidly fluctuating successive position points which are physically unrealistic. The frequency response is given and the data are corrected by a method derived by Eddy et al. Undesired high frequency oscillations are effectively eliminated and successive wind profiles show good continuity. (Author)
AD-667 918 HC$3.00 MF$0.65

BALLISTICS OF LONG-RANGE GUIDED ROCKETS,
Foreign Technology Div Wright-Patterson AFB Ohio
For primary bibliographic entry see Field 16D.
AD-668 095 HC$3.00 MF$0.65

16D. Missiles

THE LAW OF THE ROCKET SERVICE,
Foreign Technology Div Wright-Patterson AFB Ohio
For primary bibliographic entry see Field 15C.
AD-668 063 HC$3.00 MF$0.65

BALLISTICS OF LONG-RANGE GUIDED ROCKETS,
Foreign Technology Div Wright-Patterson AFB Ohio
R. F. Appazov, S. S. Lavrov, and V. P. Mishin.
26 Sep 67, 223p Rept no. FTD-MT-24-177-67
Edited machine trans. of Ballistika Upravlyaemykh Raket Dalnego Deistviya, Moscow, 1966 307p.

Descriptors: (*Guided missiles, Ballistics), (*Guided missile trajectories, Textbooks), Equations of motion, Gravity, Aerodynamic characteristics, Approximation (Mathematics), Digital computers, Numerical methods and procedures, Perturbation theory, Design, Ranges (Distance), USSR.
Identifiers: Translations.

This book serves as an introduction to the study of the ballistics of long-range missiles. It discusses flight theory and methods of calculating trajectories. Contents: General theory of motion; Ballistic calculations of controlled long-range rockets; Dispersion with firing by long-range rockets; and Selecting the form of the trajectory.
AD-668 095 HC$3.00 MF$0.65

17. NAVIGATION, DETECTION, COMMUNICATIONS, AND COUNTERMEASURES

17A. Acoustic Detection

ACOUSTICAL, METEOROLOGICAL, AND SEISMIC DATA REPORT - SOTRAN V AND VI,
Atmospheric Sciences Lab White Sands Missile Range N Mex
For primary bibliographic entry see Field 19D.
AD-667 915 HC$3.00 MF$0.65

A STUDY IN ACOUSTIC DIRECTION FINDING,
Atmospheric Sciences Lab White Sands Missile Range N Mex
Walter S. Nordquist, Jr. Nov 67, 24p
ECOM-5165

Descriptors: (*Direction finding, Acoustic detectors), (*Artillery fire, *Acoustic detectors), Sound signals, Microphones, Radiosondes, Configuration, Meteorological parameters, Azimuth, Corrections, Errors, Mathematical analysis, Tables, Sound transmission.
Identifiers: Acoustic ray tracing.

The azimuth to a gun probe launcher position from an acoustic array located approximately six miles distant was determined from the acoustic data associated with a series of seven firings. Application of a meteorological correction technique using rawinsonde data indicates that the azimuth may be corrected up to forty percent of the total error if the rawinsonde sounding is taken at the time of firing and decreases from that value at a rate which is a function of the stability of the air mass involved. (Author)
AD-667 916 HC$3.00 MF$0.65

UNITED STATES NAVAL OCEANOGRAPHIC OFFICE MARINE GEOPHYSICAL SURVEY PROGRAM 1965-1967 NORTH ATLANTIC OCEAN, NORWEGIAN SEA, AND MEDITERRANEAN SEA, AREA 2, VOLUME 6, OCEANOGRAPHIC STATIONS AND VELOCITY PROFILES.
Texas Instruments Inc Dallas Science Services Div
For primary bibliographic entry see Field 8J.
D-668 178 HC$3.00 MF$0.65

ECHO SOUNDING,
National Science Foundation, Washington, D. C. Special Foreign Currency Science Information Program.
Stanislaw Szymborski. 1967, 25p SFCSI-Int (TT-67-56062)
Trans. of Politechnika, Danzig. Zeszyty Naukowe (Poland) n17 p77-101 1959, tr. by M. Sierpinski.

Descriptors: (*Echo ranging, Poland), Dams, Sedimentation, Underwater sound signals, Acoustic properties, Acoustic equipment, Recording systems, Electronic equipment, Synchronization (Electronics), Hydrographic sonar.

Sounding of water reservoirs provides man with essential information on the water itself and on the possibility of any relevant technical action planned by him. Such sounding must, in many cases, be repeated, if rising or lowering of the bottom changes the conditions of exploitation of a given reservoir or of a structure set in its bottom. Bathometry of lakes and seas enables ichthyologists to find and chart the fishing grounds. Sometimes, during soundings, also the depth of the fish shoals running under the sounding ship can be found. Such findings add to the store of information on the distribution of the biomass, and may be of essential importance for fishermen. (Author)
TT-67-56062 HC$3.00

17B. Communications

ON DISTRIBUTED COMMUNICATIONS. I. INTRODUCTION TO DISTRIBUTED COMMUNICATIONS NETWORKS.
RAND Corp., Santa Monica, Calif.
Paul Baran. Aug 64, 37p RM-3420-PR
Contract AF 49 (638)-700

Descriptors: (*Armed forces operations, *Data transmission systems), (*Communication systems, Design), Hardening, Networks, Redundant components, Command + control systems, Communications central, Automation.

This memorandum, the first in the series entitled on distributed communications, introduces the system concept and outlines the requirements for and design considerations of a digital data communications system based on the distributed concept, especially as regards implications for such systems in the 1970s. In particular, the memorancum is directed toward examining the use of redundancy as one means of building communications systems to withstand heavy enemy attacks. While slightly survivable and reliable communications systems are of primary interest to those in the military concerned with automating command and control functions. The basic notions are also of interest to communications systems planners and designers having need to transmit digital data. (Author)
AD-444 830 HC$3.00

WIDEBAND DIGITAL MODULATION AND DETECTION TECHNIQUES FOR TROPOSCATTER.
Final rept. 1 Jul 66-15 Dec 67,
Communications and Systems Inc Paramus N J
E. Levine, F. Kupersmith, R. T. Adams, D. Sacks, and P. Grobert. Mar 68, 108p Rept no. C/S-68-TR-2623
ECOM-02542-F
Contract DA-28-043-AMC-02542 (E)

Descriptors: (*Data transmission systems, *Multipath transmission), Troposphere, Modulation, Demodulation, Digital systems, Microwave communication systems, Broadband, Modulators, Demodulators, Performance (Engineering).
Identifiers: Modems, AN/GRC-66, Digital communication systems, Time-frequency-phase modulation.

A new technique was devised and implemented for optimum transmission of digital data rates up to 2.3 megabits over tactical troposcatter paths of 50 to 150 miles in the 5 GHz band. The basic approach, resulting from a study of fading and multipath propagation statistics, is a time-frequency-phase keying pattern designed to resist multipath echoes and maximize performance through coherent detection of four-phase modulation on two frequencies transmitted one at a time. Dual in-band (single antenna) diversity is provided plus optional space diversity through quadruple predetection combining. Several innovations in digital equivalents of analog circuits were used in the breadboard model which was interfaced with the ECOM experimental Hexagon-Tobyhanna link. Performance calculations predict an increase of 2 to 1 in maximum range for an error probability on the order of 0.00001 compared to orthodox FSK or binary FM using space diversity. Single antenna (in-band diversity) performance is expected to be superior to FSK with two antennas at the same distance. Laboratory tests with the ECOM troposcatter simulator indicated that the expected reduction in multipath effects is obtained and that the in-band diversity is effective. (Author)
AD-667 899 HC$3.00 MF$0.65

ARMY AIRCRAFT VOICE-WARNING SYSTEM STUDY.
Bunker-Ramo Corp Canoga Park Calif
For primary bibliographic entry see Field 1C.
AD-667 924 HC$3.00 MF$0.65

RADIO 70 YEARS: COLLECTION ARTICLES.
Foreign Technology Div Wright-Patterson AFB Ohio

30 Jun 67, 422p Rept no. FTD-MT-65-496
Edited machine trans. of mono. Radio 70 Let. Moscow, 1965 p1-334.

Descriptors: (*Radio communication systems, Reports), (*Navigation, Reports), (*Radio astronomy, Reports), (*Radio transmission, Reports), Radio equipment, Space communication systems, Radio relay systems, Telegraph systems, Television communication systems, Radio broadcasting, Radar navigation, Radio navigation, Antennas, Semiconductor devices, Electron tubes, Transmission lines, Telemeter systems, USSR.
Identifiers: Translations.

Contents: The path of radio development in the USSR; The role of radio in space conquest; Radio relay communication; Distant radio communications on sky waves; Development of the theory and technology of phase telegraphy; Technical facilities of television network; Technology of broadcasting; Radar and radio navigation; Radio astronomy; Radar investigations of the solar system planets; Radio wave propagation; Antenna technology; Quantum radio engineering; Radio transmitting technology; Radio reception technology; Semiconductor electronics; Electronic devices; High-frequency communication on cable lines; Telemetry and remote control in the national economy.
AD-667 925 HC$3.00 MF$0.65

SELECTION OF A PULSE MODULATION COMMUNICATION SYSTEM BASED ON RESULTS OF INTELLIGIBILITY MEASUREMENTS,
Martin Co Orlando Fla
Charles C. Diaz, and B. R. Norvell. 1964, 18p
Contract DA-36-039-AMC-00147 (E)

Descriptors: (*Voice communication systems, Performance (Engineering)), Pulse modulation, Intelligibility, Signal-to-noise ratio, Acceptability, Military requirements, Speech transmission, Auditory acuity, Acoustic properties, Background, Correlation techniques, Amplifiers, Oscilloscopes, Recording systems, Earphones, Test methods, Statistical analysis.

A method for comparison of pulse modulation communication systems based on results of intelligibility measurements is presented.
AD-667 985 Not available from CFSTI.

RADIO INTERFERENCE PREDICTION BY THE STATISTICAL TERRAIN METHOD.
Final rept.,
C-E-I-R Inc Arlington Va
Roger A. Burt. 26 Apr 66, 62p
Contract DA-28-043-AMC-00346 (E)

Descriptors: (*Radio interference, Mathematical prediction), Electromagnetic properties, Compatibility, Radio signals, Statistical processes, Mathematical models, Radio receivers, Flow charting, Programming (Computers), Radio communication systems, Performance (Engineering), Channel selectors, Attenuation, Ionospheric propagation.
Identifiers: Graphs (Charts), Terrain (Statistics), Rejection (Radio reception), Computer analysis.

The electromagnetic compatability branch of the U. S. Army electronic laboratories has settled on a single conceptual framework for the study of electromagnetic compatibility problems and the prediction of interference in large radio communication systems. The framework is called the statistical terrain method of predicting interference. It is based on computer calculations of probabilities of three mutually-exclusive behavior states for every operative radio receiver in a system under study. The probability calculations depend upon the signal environment of the receivers, the receiver operating characteristics, and certain statistical propagation loss models. This report contains an expository mathematical description of the statistical terrain method and an explanation of the computer implementation of the method.
AD-667 987 HC$3.00 MF$0.65

APPARENT POLEWARD MOTION OF ONSETS OF AURORAL ABSORPTION EVENTS,
Defence Research Telecommunications Establishment Ottawa (Ontario) Radio Physics Lab
For primary bibliographic entry see Field 4A.
AD-668 010 Not available from CFSTI.

PERFORMANCE OF A 3.3-mm RADIOMETER.
Rept. for May 63-Jun 67,
Aerospace Corp El Segundo Calif Lab Operations
Walter A. Johnson. Feb 68, 24p Rept no. TR-0158 (3230-46)-13
SAMSO-TR-68-136
Contract F04695-67-C-0158

Descriptors: (*Radiometers, Performance (Engineering)), Radio equipment, Noise (Radio), Power spectra, Distribution, Space communication systems, Response, Density, Stability, Measurement, Reliability (Electronics).

The performance of a 3.3-mm radiometer, operational in the Space Radio Systems Facility of the Aerospace Corporation since December 1963, is described, and a criterion for judging the long-integration time performance of the radiometer is discussed. This criterion is applied to a study of radiometer output noise; from the results, it is inferred that the output noise spectral distribution is flat from approximately 0.0005 to a few Hz. (Author)
AD-668 108 HC$3.00 MF$0.65

RADIO PROPAGATION IN RE-ENTRY PLASMAS,
Boeing Scientific Research Labs Seattle Wash Plasma Physics Lab
James E. Drummond. Oct 67, 18p Rept no. D1-82-0698

Descriptors: (*Radio transmission, *Atmosphere entry), (*Plasma medium, *Blackout (Electromagnetic)), Ferrites, Propagation, Stagnation point, Plasma oscillations, Magnetic fields, Electric fields, Radio interference, Attenuation, Whistlers, Kinetic theory, Very high frequency, Mathematical analysis.
Identifiers: Magnetic windows, Maxwells equations, Boltzmann equation.

Altitude versus speed profiles for space ships entering earth's atmosphere from orbit, from the moon, and from a planet were used to estimate plasma and collision frequencies in the stagnation and expansion regions. The lunar and planetary profiles are shown to result in plasmas dominated by non-local conductivity. Weibel's analysis is adapted to apply for 'whistler' mode propagation in a plasma with a magnetic field. The B field produced by a ferrite radio window (250 gauss 10 cm from its pole face) is used to calculate the attenuation parameter of a 100 MHz telemetry signal. It is found that the radio 'blackout' along the orbital re-entry profile is eliminated for these parameters. However, this is not so for the lunar and planetary re-entry profiles. It would require about twenty-five times as much B field to cure these 'blackout' blues. (Author)
AD-668 162 HC$3.00 MF$0.65

RADIO PULSES FROM EXTENSIVE AIR SHOWERS AT 520 MHz.
University Coll Dublin (Ireland) Dept of Physics
For primary bibliographic entry see Field 4A.
AD-668 208 Not available from CFSTI.

ELECTROMAGNETIC FIELDS IN THE OCEAN NEAR A SHORELINE (PART II).
Rhode Island Univ Kingston
For primary bibliographic entry see Field 20N.
AD-668 341 HC$3.00 MF$0.65

AUTOMATED CURTS HF: REAL-TIME MANAGEMENT AND ADMINISTRATION OF HF SYSTEMS AND FREQUENCY RESOURCES.
Final rept. (Part 3),
Stanford Research Inst Menlo Park Calif
T. I. Dayharsh, J. L. Gnagy, and S. E. Probst.
Feb 68, 120p
Contract DCA100-67-C-0068

Descriptors: (*Radio communication systems, Management engineering), High frequency, Radio transmission, Optimization, Reliability, Cost effectiveness, Performance (Engineering), Military requirements, Impact, Networks, Intensity, Resolution, Quality control, Documentation, Automation, Management planning, Management control systems.
Identifiers: CURTS (Common user radio transmission sounding), *Common user radio transmission sounding.

Extensive testing of the CURTS Phase II System has conclusively demonstrated that the CURTS hardware and software used by that system will have a significant impact--when used as described in the existing DCA CURTS plan--on the quality, reliability, availability, and cost effectiveness of the existing DCS HF plant. This report discusses the optimization of the proposed operational CURTS system (a system similar to the CURTS Phase II network) and the extension of that system (by frequency management software) to provide service to other DOD, to NCS, and to international users. The report answers a key question advanced in the second final report of this series: 'How much improvement will be brought from a given amount of management.' Further, it constitutes the study recommended in that report by detailing the method for achieving the maximation of both economic and military CURTS benefits. The current technical, managerial, and administrative problems of HF communications systems are described and are shown to limit the performance of the DCS (and other) HF systems to levels of reliability and quality that are significantly below actual system potential. With the evolution of the CURTS system, the economic value of the DOD HF system will increase, in terms of replacement systems, from a current annual value of $45 million to a final annual value of $118 million. (Author)
AD-668 347 HC$3.00 MF$0.65

PROPAGATION OF LOW AND HIGH POWER RADIO WAVES IN IONIZED MEDIA.
Final rept. 1 Apr 65-31 Aug 67,
Rydbeck Research Associates Fjaras (Sweden)
O. E. H. Rydbeck. 31 Aug 67, 78p
Contract AF 61 (052)-864

Descriptors: (*Radio transmission, Reports), Ionization, Stability, Reflection, Amplifiers, Magnetic fields, Energy, Interactions, Radiofrequency amplifiers, Transients, Electromagnetic waves, Mathematical analysis, Partial differential equations, Radiofrequency power, Whistlers.

The report covers investigations and research concerning the following main subjects, viz., Amplification properties and self oscillations of pumped, ionized media, Basic properties of coupled wave equations with variable coefficients, Energy flow properties of electromagnetic and of general multimode media, Coupled waves in magneto-ionic media, Coupled waves in ionized media with streaming electrons, Wave propagation in a double hump, isotropic, ionized medium, Transient wave response of an inhomogeneous, isotropic, ionized medium, D:o in a homogeneous magneto-ionic medium (longitudinal propagation). (Author)
AD-668 457 HC$3.00 MF$0.65

LES-5 TRIPLEXER.
Technical rept.,
Massachusetts Inst. of Tech., Lexington. Lincoln Lab.
Arthur Sotiropoulos. 31 Aug 67, 20p TR-438
ESD-TR-67-492
Contract AF 19 (628)-5167

Descriptors: (*Duplexers (Electronic), Satellite antennas), (*Antenna components, Duplexers (Electronic)), (*Band-pass filters, Performance (Engineering)), Measurement, Communication satellites (Active), Ultrahigh frequency, Radio equipment, Telemeter systems, Transmission lines, Design.
Identifiers: *Triplexers, Les-5 satellite.

The report describes the triplexer used in the UHF communications satellite LES-5. The triplexer is a four-port passive microwave structure which provides a common antenna port for simultaneous operation at the transmit, telemetry, and radio-frequency interference/receive frequencies, and consists of three interdigital band-pass filters connected by appropriate lengths of transmission line. (Author)
AD-823 174 HC$3.00 MF$0.65

CONSTRUCTING INEXPENSIVE AUTOMATIC PICTURE-TRANSMISSION GROUND STATIONS.
National Aeronautics and Space Administration, Washington, D. C.
C. H. Vermillion. 1968, 68p NASA-SP-5079

Descriptors: *Automatic picture transmission, *Engineering drawings, *Equipment specifications, *Ground stations, Aerial photography, Data transmission, Photographs, Photointerpretation, Television systems, Television transmission.

For abstract, see STAR 06 10.
N68-19624 HC$3.00 MF$0.65

INTERPLANETARY ELECTRON CONTENT MEASURED BETWEEN EARTH AND THE PIONEER 6 AND 7 SPACECRAFT USING RADIO PROPAGATION EFFECTS.
Stanford Univ., Calif. Radioscience Lab.
For primary bibliographic entry see Field 3B.
For abstract, see STAR 06 10.
N68-19889 HC$3.00 MF$0.65

SUMMARY OF THE RESULTS OF FEASIBILITY STUDIES OF DIRECT VOICE BROADCASTING UNDERTAKEN FOR THE NATIONAL AERONAUTICS AND SPACE ADMINISTRATION.
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
G. J. Chomos, P. W. Kuhns, and P. Ramins. 1968, 16p NASA-TM-X-52409
Conf- To Be Presented At the Intern. Radio Consultive Comm. Meeting, Palma, Spain, 26 Apr. - 8 May 1968

Descriptors: *Broadcasting, *Communication satellites, *Radio communication, Cost estimates, Frequencies, Radio receivers, Radio transmission, Voice communication.

For abstract, see STAR 06 10.
N68-20260 HC$3.00 MF$0.65

SPACE PROGRAMS SUMMARY NO. 37-49, VOLUME 2 FOR THE PERIOD NOVEMBER 1 TO DECEMBER 31, 1967. THE DEEP SPACE NETWORK.
Jet Propulsion Lab., Calif. Inst. of Tech., Pasadena.
31 Jan 68, 155p NASA-CR-93821, JPL-SPS-37-49, V. 2
Contract NAS7-100

Descriptors: *Communication equipment, *Deep space instrumentation facility, *Deep space network, *Radio navigation, *Systems engineering, *Telemetry, Accuracy, Data acquisition, Satellite tracking.

For abstract, see STAR 06 10.
N68-20335 HC$3.00 MF$0.65

MODIFICATIONS ON MAGNAVOX MODEL B RECEIVER.
Centro Di Studio Per La Fisica Delle Microonde, Florence (Italy).
P. F. Checcacci, and R. T. Gradassi. Jul 64, 39p CM-R15-2.4

Descriptors: *Printed circuits, *Radio receivers, Doppler effect, Electronic equipment tests, Ground support equipment, Improvement, Intermediate frequency amplifiers, Preamplifiers, Signal reception, Specifications.

For abstract, see STAR 06 10.
N68-20418 HC$3.00 MF$0.65

DIGITAL TECHNIQUES IN SPACE COMMUNICATION.
Trasmissioni Numeriche Spaziali
Centro Di Studio Per La Fisica Delle Microonde, Florence (Italy).
V. Cappellini. Feb 67, 79p CM-R46-10.5
Lang- in Italian

Descriptors: *Data transmission, *Digital techniques, *Multiplexing, *Space communication, Analog to digital converters, Pulse code modulation, Signal encoding, Telemetry.

For abstract, see STAR 06 10.
N68-20419 HC$3.00 MF$0.65

INSTRUCTION MANUAL FOR IONOSPHERIC DRIFT MEASUREMENTS. THE DETERMINATION OF IONOSPHERIC DRIFTS FROM THREE-RECEIVER FADING RECORDS.
Adelaide Univ. (Australia). Dept. of Physics.
B. H. Briggs. 1968, 37p

Descriptors: *Ionospheric drift, *Manuals, *Signal fading, Correlation, Random errors, Receivers, Statistical analysis, Wave dispersion, Wave propagation.

For abstract, see STAR 06 10.
N68-20525 HC$3.00 MF$0.65

17E. Infrared and Ultraviolet Detection

MILLIMETER WAVE RADIOMETRIC DETECTION OF TARGETS OBSCURED BY FOLIAGE.
Memorandum rept.,
Ballistic Research Labs Aberdeen Proving Ground Md
Richard A. McGee. Jan 68, 24p Rept no. BRL-MR-1901

Descriptors: (*Target acquisition, Millimeter waves), (*Millimeter waves, Radiometers), Detection, Passive, Terrain, Penetration, Ranges (Distance), Mathematical models, Curve fitting, Sky.
Identifiers: Foliage.

The problem of passive detection by millimeter wave radiometry of metallic targets obscured by foliage and other vegetation is defined and discussed. A model of the foliage obscuration situation is presented and evaluated on the basis of data collected in a field measurement program. Results obtained show the millimeter wave radiometric obscuration to be greater than the optical obscuration. Curve fitting techniques indicate a quadratic relationship between radiometric and optical obscuration; hence, the maximum range of a radiometric system will be reduced linearly with optical obscuration instead of theoretically with a

square root relationship. Further refinements of the model are discussed and are to be included in a general foliage penetration model to be evaluated at a later date. (Author)
AD-667 962 HC$3.00 MF$0.65

17G. Navigation and Guidance

RADIO 70 YEARS: COLLECTION ARTICLES.
Foreign Technology Div Wright-Patterson AFB Ohio
For primary bibliographic entry see Field 17B.
AD-667 925 HC$3.00 MF$0.65

A MODIFIED KALMAN FILTER FOR RADIO GUIDANCE APPLICATION,
Aerospace Corp El Segundo Calif
J. A. Henz. Dec 67. 131p Rept no. TR-0158 (3124)-1
SAMSO-TR-68-155
Contract F04695-67-C-0158

Descriptors: (*Command guidance, *Data processing systems), Mathematical logic, Mathematical prediction, Mathematical models, Matrix algebra, Transformations (Mathematics), Radar tracking, Optimization, Equations, Computer programs, Noise, Errors, Spacecraft, Information theory, Analysis of variance.
Identifiers: *Kalman filters, Optimal filters, Graphs (Charts).

The modified Kalman filtering technique offers several distinct advantages over filters used previously in radio guidance equations. Presented are: a derivation of the Kalman filter; the filter force, measurement, and noise models; the transition matrix and coordinate transformation matrix derivations; a description of the modified filter equations; and results obtained from a computer program using the modified filter equations. (Author)
AD-668 447 HC$3.00 MF$0.65

DESIGN OF A PRECISION TILT AND VIBRATION ISOLATION SYSTEM.
National Aeronautics and Space Administration. Electronics Research Center, Cambridge, Mass.
H. Weinstock. Mar 68. 169p NASA-TR-R-281
Contract 125-17-01-18

Descriptors: *Gyroscopes, *Servomechanisms, *Stabilized platforms, *Vibration isolators, Attitude (inclination), Leveling, Pneumatic equipment, Test facilities.

For abstract, see STAR 06 10.
N68-19642 HC$3.00 MF$0.65

GUIDANCE, FLIGHT MECHANICS AND TRAJECTORY OPTIMIZATION. VOLUME 2 - OBSERVATION THEORY AND SENSORS.
North American Aviation, Inc., Downey, Calif.
For primary bibliographic entry see Field 22B.
For abstract, see STAR 06 10.
N68-19676 HC$3.00 MF$0.65

GUIDANCE, FLIGHT MECHANICS AND TRAJECTORY OPTIMIZATION. VOLUME 14 - ENTRY GUIDANCE EQUATIONS.
North American Aviation, Inc., Downey, Calif.
For primary bibliographic entry see Field 22C.
For abstract, see STAR 06 10.
N68-19985 HC$3.00 MF$0.65

17H. Optical Detection

OPTICAL TRACKING OF DEEP-SPACE PROBES,
Boeing Scientific Research Labs Seattle Wash Geo-Astro Physics Lab
H. B. Liemohn. Feb 68. 14p Rept no. D1-82-0690
Availability: To be published in Icarus.

Descriptors: (*Optical tracking, *Spacecraft), Mirrors, Reflection, Sun, Moon, Accuracy, Telescopes, Lunar satellites, Mars probes, Venus probes, Ephemerides.
Identifiers: Orbiter 5 spacecraft.

Specular reflection of sunlight from plane mirror surfaces on deep-space probes is sufficiently bright to be detected with large telescopes on Earth. The optical requirements for the reflector surface and the pointing requirements for its orientation are not stringent because the Sun is an extended source. Curves are derived for the apparent stellar magnitude as a function of earth-spacecraft range for a variety of reflector properties. The feasibility of optical tracking was demonstrated recently when sunlight reflected from solar panels and mirrors on Lunar Orbiter V was detected photographically at Earth. Moderate-sized reflectors will allow optical tracking with surface telescopes as far as Venus and Mars, and observations above the Earth's atmosphere would permit tracking in a large portion of the solar system. Significant improvements in the ephemerides of the Moon and planets are possible by photographing orbiters with respect to the stellar background. Optical data in the plane perpendicular to the line of sight may also be a useful supplement to the radar tracking data during critical maneuvers. (Author)
AD-668 001 Not available from CFSTI.

AN F/2 FOCAL REDUCER FOR THE 60-INCH U. S. NAVAL OBSERVATORY TELESCOPE.
Technical rept.,
Arizona Univ Tucson Optical Sciences
A. B. Meinel, and G. W. Wilkerson. 28 Feb 68. 63p Rept no. TR-7

Descriptors: (*Telescopes, Astronomical observatories), (*Astronomical observatories, Arizona), Focusing, Design, Mirrors, Performance (Engineering), Optical images, Thickness, Collimators, Diffraction gratings, High-speed cameras, Computer programs, Optical equipment components.

The report deals with the development of a relay system--from telescope to collimator to grating (and/or filter) to high-speed camera--in order to speed up exposure time by a factor of about 20 for the U.S Naval Observatory's largest telescope, which is at Flagstaff, Arizona. The primary mirror is a 60-inch-diameter paraboloid. (Author)
AD-668 383 HC$3.00 MF$0.65

KINETHEODOLITE OBSERVATIONS MADE AT EARLYBURN, APRIL TO JUNE 1965 - SATELLITE 1961 ALPHA 1.
Royal Observatory, Edinburgh (Scotland). Satellite Tracking Section.
B. Mc Innes. 16 Feb 68. 8p ROE-STS-70

Descriptors: *Cinetheodolites, *Samos, Photographic tracking, Satellite tracking, Tables (data), Transit satellites.

For abstract, see STAR 06 10.
N68-20299 HC$3.00 MF$0.65

KINETHEODOLITE OBSERVATIONS MADE AT EARLYBURN, OCTOBER 1964 TO MARCH 1966 - SATELLITE 1960 GAMMA 2.
Royal Observatory, Edinburgh (Scotland). Satellite Tracking Section.
B. Mc Innes. 9 Feb 68. 12p ROE-STS-69

Descriptors: *Cinetheodolites, *Satellite observation, *Transit 1b satellite, Great britain, Satellite tracking, Tables (data), Transit time.

For abstract, see STAR 06 10.
N68-20306 HC$3.00 MF$0.65

STOPWATCH OBSERVATIONS OF SATELLITES, NOVEMBER 1967.
Royal Observatory, Edinburgh (Scotland). Satellite Tracking Section.
R. D. Eberst. 7 Feb 68. 21p ROE-STS-68

Descriptors: *Optical tracking, *Satellite tracking, Binoculars, Orbit calculation, Photographic tracking, Satellite observation, Tables (data), Theodolites, Transit satellites.

For abstract, see STAR 06 10.
N68-20308 HC$3.00 MF$0.65

17I. Radar Detection

VISIBILITY ON RADAR SCOPES,
Johns Hopkins Univ., Baltimore, Md. Psychological Lab.
For primary bibliographic entry see Field 5H.
AD-493 403 HC$3.00

A DATA REDUCTION TECHNIQUE FOR METEOROLOGICAL WIND DATA ABOVE 30 KILOMETERS,
Atmospheric Sciences Lab White Sands Missile Range N Mex
For primary bibliographic entry see Field 16B.
AD-667 918 HC$3.00 MF$0.65

USE OF THE AN/FPS-77 FOR QUANTITATIVE WEATHER RADAR MEASUREMENTS.
Instrumentation papers no. 137,
Air Force Cambridge Research Labs L G Hanscom Field Mass
Wilbur H. Paulsen. Jan 68. 14p Rept no. AFCRL-68-0013

Descriptors: (*Meteorological radar, Performance (Engineering)), Atmospheric precipitation, Radar reflections, Reflectivity, Backscattering, Measurement, Rayleigh scattering, Nomographs.
Identifiers: AN/FPS-77.

A review is made of the assumptions that must be made in using a weather radar set for quantitative measurements of weather echoes. A simplified derivation is provided showing the relationship between the purely meteorological 'radar reflectivity factor' Z and the radar received power for any weather radar set when the assumptions are fulfilled. A nomogram furnished for use with the AN/FPS-77 enables a simple conversion of receiver power to Z values. (Author)
AD-668 090 HC$3.00 MF$0.65

STATISTICAL ANALYSIS OF TEMPERATURE DATA FROM WIND TUNNEL TEST OF A VON KARMAN RADOME.
Technical memo.,
Johns Hopkins Univ Silver Spring Md Applied Physics Lab
Manford B. Tate. Mar 68. 29p Rept no. APL-TG-983
Contract NOw-62-0604

Descriptors: (*Radomes, Thermal stresses), Statistical analysis, Temperature, Thickness, Distribution, Aerodynamic heating, Blunt bodies.
Identifiers: *Von Karman radomes.

Temperatures obtained from a wind-tunnel test on a Von Karman radome are studied and put into functional form for theoretical analysis of radome thermal stresses. It was found that the radome wall temperature can be expressed analytically by a single function that defines the temperatures at all points in the wall except for a short length near the tip for which another expression is developed. The single function is further separable by variables into two functions, one of which describes the spanwise distribution and the other, the wall-thickness distribution of the temperature. This finding is highly advantageous mathematically. The analytical and test results are presented and compared in three figures and recorded in two tables. Good agreement between experiment and analysis was found to exist with the difference range generally not in excess of approximately plus or minus 7 percent while being less than half this amount in most cases. The derived function overestimates the maximum temperatures by about 0.5 percent, but this is a conservative feature

insofar as the theoretical prediction of thermal stress is concerned. The range of experimental error in the original data was reported by the test engineers to be also about plus or minus 7 percent. (Author)
AD-668 135 HC$3.00 MF$0.65

FUNCTIONALIZATION OF PYROCERAM 9606 TEST DATA FOR RADOME THERMAL-STRESS ANALYSIS.
Technical memo.,
Johns Hopkins Univ Silver Spring Md Applied Physics Lab
M. B. Tate. Mar 68, 22p Rept no. APL-TG-980
Contract NOw-62-0604

Descriptors: (*Radomes, Stresses), (*Heat-resistant glass, Radomes), Thermal stresses, Thermal expansion, Modulus of elasticity, Data, Differential equations.
Identifiers: Pyroceram.

For the thermal-stress analysis of radomes built of Pyroceram 9606, the experimentally determined material properties and thermal expansion are studied and expressed as functions of the temperature. The data reduction methods are described in the text and appendix. They were generally based on minimization of the squared error function. In a few cases, the method of equalizing the maximum positive and negative percentage errors was employed. Different regression formulas for different uses are given, according to the degree of accuracy that the analyst elects to maintain. Overall, the derived functions represent the test points within 0.3 to 3 percent approximately, depending on which expression is selected for a particular application. (Author)
AD-668 136 HC$3.00 MF$0.65

COMPOUND-OGIVE RADOMES AS SUBSTITUTE STRUCTURES FOR VON KARMAN SHAPES.
Technical memo.,
Johns Hopkins Univ Silver Spring Md Applied Physics Lab
Manford B. Tate. Mar 68, 27p Rept no. APL-TG-985
Contract NOw-62-0604

Descriptors: (*Radomes, *Thermal stresses), Aerodynamic heating, Aerodynamic configurations, Structural properties, Simulation, Ogives, Wind tunnel models, Temperature, Distribution.

A tangent-ogive and three compound-ogive radomes are examined for use of one of them as a substitute structure in analysis of Von Karman radome thermal stresses. A tricentric ogive-cone radome is chosen as the substitute, because it provides a highly satisfactory representation of the Von Karman profile both in regard to approximate duplication of cross-sectional radii and coordinate angles for nearly all values of the spanwise variable. The introduction of a substitute structure is made necessary by the absence of stress solutions for the Von Karman profile type of structure in current and past technical literature, but a theoretical solution for ogive shapes is available. Also, the temperature distribution obtained in previous investigations on the Von Karman test radome is herein successfully imposed on the substitute structure with results that agree within two percent of those computed from formulas that were obtained in the earlier studies. (Author)
AD-668 142 HC$3.00 MF$0.65

AIR PROPERTIES AND FLOW CONDITIONS AROUND THE NOSE OF A BLUNT RADOME.
Technical memo.,
Johns Hopkins Univ Silver Spring Md Applied Physics Lab
Manford B. Tate. Mar 68, 46p Rept no. APL-TG-981
Contract NOw-62-0604

Descriptors: (*Radomes, Aerodynamic characteristics), Blunt bodies, Flow fields, Thermal stresses, Aerodynamic heating, Axially symmetric flow, Subsonic characteristics, Supersonic characteristics, Shock waves, Equations of motion, Compressible flow.
Identifiers: Von Karman radomes.

In order to correlate data obtained in tests on Von Karman radomes with theoretical analyses of thermal stresses in ogive radomes, the temperature and flow conditions around the nose of a blunt radome were investigated, and the results are reported. The blunt nose causes a detached shock wave to form with a transonic flow region developed between the wave front and the nose. Approximate solutions for the velocity components in the highly nonlinear behavior are obtained, and detachment distances compared with published experimental data. Subsonic and supersonic compressible flows are studied, and the incompressible case is shown for comparison. Two numerical examples are given to illustrate the evaluation of initially unknown exponents and the computation of constants in the velocity equations. (Author)
AD-668 145 HC$3.00 MF$0.65

CURVATURE RADII AND DERIVATIVES FOR THERMAL-STRESS ANALYSIS OF VON KARMAN RADOMES.
Technical memo.,
Johns Hopkins Univ Silver Spring Md Applied Physics Lab
Manford B. Tate. Mar 68, 17p Rept no. APL-TG-982
Contract NOw-62-0604

Descriptors: (*Radomes, Thermal stresses), Thermal analysis, Configuration, Geometry, Curved profiles, Heating, Aerodynamic characteristics, Performance (Engineering).

Basic characteristics of the Von Karman radome configuration are examined and evaluated. Both general and specific results are developed that are required in analyses of stresses, heating effects, and aerodynamic behavior. As a numerical example, the envelope curve for all the principal radii of curvature is obtained for a 28.3 x 6.75 inch Von Karman radome. The numerical results are given in two tables and plotted in two figures. A graphical construction is also included to illustrate the relationship between parametric forms and other coordinates that define the profile curve. (Author)
AD-668 146 HC$3.00 MF$0.65

MILLSTONE AND HAYSTACK SCIENTIFIC AND TECHNICAL PUBLICATIONS.
Massachusetts Inst of Tech Lexington Lincoln Lab
9 Apr 68, 30p Rept no. Bibliography-36
ESD-TR-68-56
Contract AF 19(628)-5167

Descriptors: (*Radar stations, Bibliographies), (*Radio astronomy, Bibliographies), Microwaves, Ionosphere, Moon, Planets, Satellites (Artificial), Atmosphere, Instrumentation, Radar antennas.
Identifiers: Millstone radar, Haystack microwave station.

This document is a bibliography of most of the significant publications, in whatever form, resulting from the work conducted at the Millstone Radar Facility and the Haystack Microwave Research Facility, two of the major instruments at Lincoln Laboratory's Millstone Hill Field Station. (Author)
AD-668 435 HC$3.00 MF$0.65

MILLSTONE HILL THOMSON SCATTER RESULTS FOR 1964.
Massachusetts Inst of Tech Lexington Lincoln Lab
For primary bibliographic entry see Field 4A.
AD-668 436 HC$3.00 MF$0.65

CLUTTER SUPPRESSION PROPERTIES OF WEIGHTED PULSE TRAINS.
Rept. for Jun-Dec 67,
Aerospace Corp El Segundo Calif Lab Operations
Richard L. Mitchell, and August W. Rihaczek.
Feb 68, 35p Rept no. TR-0158 (3230-46)-9
SAMSO-TR-68-142
Contract F04695-C-0158

Descriptors: (*Coherent radar, Target aquisition), (*Radar clutter, *Suppressors), Radar pulses, Coherent scattering, Doppler systems, Effectiveness, Radar receivers, Doppler effect, Pulse modulation, Amplitude modulation, Signal-to-noise ratio, Mathematical analysis.
Identifiers: Pulse trains, Doppler filtering, Thermal noise.

A common but troublesome requirement on radar sensors is the detection of a target in the interference from undesired scatterers, or clutter. Systems with coherent processing of pulse trains are uniquely suited for the purpose because with pulse trains it is possible to concentrate the receiver output for particular values of Doppler and thus suppress the clutter by Doppler filtering. This paper discusses to what degree the effectiveness of the method can be enhanced by tapering, or weighting, of the pulse amplitudes. The general results are illustrated by computer-plotted response functions for weighted pulse trains. The clutter suppression efficiency of weighting is calculated both for unilateral weighting in the receiver and for bilateral weighting is discussed, and the results for pure amplitude weighting are compared with published work on phase and amplitude weighting. (Author)
AD-668 441 HC$3.00 MF$0.65

SPECIAL STUDIES OF AROD SYSTEM CONCEPTS AND DESIGNS.
ADCOM, Inc., Cambridge, Mass.
D. B. Crow, A. F. Ghais, and S. A. Meer. 31 Jul 67, 72p NASA-CR-61670, G-69
Contract NAS8-20128

Descriptors: *Airborne equipment, *Geodetic surveys, *Range and range rate tracking, *Signal processing, Computers, Correlation coefficients, Ground stations, Propagation modes, Satellite tracking, Spacecraft electronic equipment, Target acquisition, Wave propagation.

For abstract, see STAR 06 10.
N68-19632 HC$3.00 MF$0.65

SPECIAL STUDIES OF AROD SYSTEM CONCEPTS AND DESIGNS.
ADCOM, Inc., Cambridge, Mass.
E. J. Baghdady, K. W. Kruse, and S. A. Meer. 15 Jan 67, 68p NASA-CR-61667, G-69-TR-1
Contract NAS8-20128

Descriptors: *Airborne range and orbit determination, *Phase locked systems, *Signal to noise ratios, Automatic gain control, Loops, Performance prediction, Phase error, Radio receivers, Superhigh frequencies, Ultrahigh frequencies.

For abstract, see STAR 06 10.
N68-19825 HC$3.00 MF$0.65

EXPLORING IN AEROSPACE ROCKETRY. 13-TRACKING.
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
J. L. Pollack. 1968, 19p NASA-TM-X-52400
Conf- Presented At the Lewis Aerospace Explorers Conf., Cleveland, 1966-1967

Descriptors: *Optical tracking, *Radar tracking, *Spacecraft tracking, Azimuth, Elevation angle, Ground stations, Radio tracking, Tracking networks.

For abstract, see STAR 06 10.
N68-19829 HC$3.00 MF$0.65

A MISSION, TRACKING, COMMUNICATION AND FLIGHT OPERATION STUDY FOR THE GALACTIC JUPITER PROBE.
National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
Sep 67, 143p NASA-TM-X-63149, X-500-67-228

Descriptors: *Ground support equipment, *Ground support systems, *Jupiter atmosphere, *Spacecraft reliability, *Tracking networks, *Trajectory analysis, Launch escape systems, Launching, Space probes.

For abstract, see STAR 06 10.
N68-20036 HC$3.00 MF$0.65

MEASUREMENT OF DRAFT SPEEDS IN CONVECTIVE CLOUDS BY MEANS OF PULSED-DOPPLER RADAR,
Arizona Univ., Tucson. Inst. of Atmospheric Physics.
Louis J. Battan, and John B. Theiss. 1 Apr 67, 40p Scientific-22
Grants NSF-G14087, NSF-GP-5539

Descriptors: (*Clouds, Convection (Atmospheric)), (*Meteorological radar, Measurement), Doppler radar, Velocity, Atmospherics, Air, Scattering, Turbulence, Particle size, Raindrops, Distribution.

Data obtained by means of vertically pointing pulsed-doppler radar were used to compare two presently-used schemes for estimating vertical air velocity in convective clouds. It was found that the air velocity given by the positive bound of the doppler spectrum and the velocity obtained by the use of a procedure proposed by Rogers (1964) are well correlated. Part of the scatter can be explained as a result of uncertainties in the size distribution of scatterers assumed in Rogers' derivation. Part of the scatter can be explained in terms of difficulties in establishing the correct upper bound of the spectrum. The effects of turbulence in causing a broadening of the doppler spectrum cannot be shown to be greater than perhaps 1 or 2 m/sec. (Author)
PB-178 016 HC$3.00 MF$0.65

17J. Seismic Detection

ACOUSTICAL, METEOROLOGICAL, AND SEISMIC DATA REPORT - SOTRAN V AND VI,
Atmospheric Sciences Lab White Sands Missile Range N Mex
For primary bibliographic entry see Field 19D.
AD-667 915 HC$3.00 MF$0.65

18. NUCLEAR SCIENCES AND TECHNOLOGY

18B. Isotopes

YIELDS OF TRANSCURIUM NUCLIDES IN THE SRP HIGH FLUX REACTOR,
Du Pont de Nemours (E. I.) And Co., Aiken, S. C. Savannah River Lab.
H. Perry Holcomb. Dec 67, 11p
Contract AT (07-2)-1

Descriptors: (*Transuranium elements, Production), Plutonium, Neutron reactions, Berkelium, Californium, Einsteinium, Curium.
Identifiers: Nucleosynthesis.

For abstract, see NSA 22 08.
DP-1137 HC$3.00 MF$0.65

A DYNAMIC PROGRAMMING ALGORITHM OF THE UNITED STATES 235 U PRODUCTION FACILITIES,
Union Carbide Corp., Oak Ridge, Tenn. Computing Technology Center.
W. I. Kephart, J. R. Copper, and T. E. Pritchard.
13 Feb 68, 72p
Contract W-7405-eng-26

Descriptors: (*Power reactors, Reactor fuels), (*Reactor fuel enrichment, Uranium), (*Isotope separation, Mathematical models), Dynamic programming, Management planning, Mathematical prediction, Problem solving, Gaseous diffusion separation, Economics.

For abstract, see NSA 22 08.
K-1712 HC$3.00 MF$0.65

18C. Nuclear Explosions

A DETECTOR ENERGY INTEGRATION PROGRAM DESIGNED TO OPERATE ON THE NGM CODE OUTPUT,
Army Nuclear Defense Lab Edgewood Arsenal Md
David Vogt, and Jack Grayer. Mar 68, 114p Rept no. NDL-TM-40

Descriptors: (*Nuclear explosions, Computer programs), Monte Carlo method, Mapping, Radiation measurement systems, Nuclear weapons, Energy, Digital computers, Magnetic tape, Programming languages, Subroutines, Flow charting, Neutron flux, Gamma emission.
Identifiers: Neutron-gamma Monte Carlo transport codes.

The Los Alamos Scientific Laboratory (LASL) is generating a Neutron-Gamma Monte Carlo (NGM) transport code that will produce a differential data map of the radiation environment created by a nuclear detonation. The output provides fluxes at a series of detectors surrounding the detonation, normalized to one neutron leaving the source in the given source-energy solid angle group. By appropriately weighting the output and integrating it with respect to the variables, the radiation field of given weapons can be theoretically predicted. A set of codes has been written at the US Army Nuclear Defense Laboratory (USANDL) to perform this flux integration over any of the desired variables (source energies and angles; detector energies, angles, and times), with weighting facility to handle specific situations. This report describes a digital computer program written for the GE-225 computer. The program integrates the LASL NGM radiation transport code differential flux output over the detector energy spectrum weighted by a specified function. (Author)
AD-667 933 HC$3.00 MF$0.65

ANALYSIS OF WATER WAVES GENERATED EXPLOSIVELY AT THE UPPER CRITICAL DEPTH.
Urs Corp Burlingame Calif
For primary bibliographic entry see Field 19A.
AD-668 179 HC$3.00 MF$0.65

AURORAL INPUT-OUTPUT EXPERIMENT.
Final rept. 1 Apr 61-31 Jan 68,
Lockheed Missiles and Space Co Palo Alto Calif
Lockheed Palo Alto Research Lab
John E. Evans, Richard G. Johnson, and Roland E. Meyerott. 31 Jan 68, 310p Rept no. LMSC-8-79-68-1
Contract Nonr-3398 (00)

Descriptors: (*Ionosphere, Aurorae), (*Nuclear explosions, *Blackout (Electromagnetic)), Simulation, Spectra (Visible + ultraviolet), Charged particles, Atmosphere models, Ultraviolet radiation, Solar flares, Ionization, Networks, Backscattering, Electron density, Optical phenomena, Instrumentation, Spaceborne, Airburst, Ionospheric propagation, Radar receivers, Recombination reactions.
Identifiers: Graphs (Charts), D-region, E-region.

A study of the use of natural phenomena to simulate radio and radar blackout effects led to the development of the auroral input-output experiment. The objective was to fully document several pertinent parameters in a volume of the upper atmosphere being bombarded by fast particles. Incoming energetic particles (the input) producing the auroras were measured by an instrumented polar orbiting satellite. The optical emissions and integrated electron content (the outputs) were measured simultaneously and with good geometry by photometers and radio receiving equipment (for receiving signals from the satellite borne radio beacon) on instrumented aircraft and/or ground stations. Low energy (20 eV to 100 keV) electron and proton detectors, photometers, beacons and fast data handling equipment were developed for seven satellite packages, four of which have provided extensive data on particle fluxes, angular distributions, energy spectra and precipitation patterns and on 3914 A and vacuum uv emissions. A 5-channel filter scanning photometer (1 scan/sec) and a 3-frequency (20, 40 and 120 MHz) phase locked coherent receiver for signal strength and differential Doppler electron content measurements plus auxiliary optical and tape recording gear were adapted to aircraft use and were operated underneath the satellite transits over the auroral zone in Alaska. (Author)
AD-668 202 HC$3.00 MF$0.65

TWO-DIMENSIONAL ANALYSIS OF STRESS AND STRAIN IN SOILS. REPORT 5. PLANE-STRAIN LOADING OF A STRAIN-HARDENING SOIL.
Massachusetts Inst of Tech Cambridge Dept of Civil Engineering
For primary bibliographic entry see Field 8M.
AD-668 240 HC$3.00 MF$0.65

ENGINEERING PROPERTIES OF NUCLEAR CRATERS. REPORT 6. THEORETICAL STUDIES OF CRATERING MECHANISMS AFFECTING THE STABILITY OF CRATERED SLOPES, PHASE III.
Duke Univ Durham N C School of Engineering
For primary bibliographic entry see Field 8M.
AD-668 247 HC$3.00 MF$0.65

SURFACE RESPONSE OF AN ELASTIC MEDIUM TO NORMAL PRESSURES APPLIED OVER CONSTANT AND EXPANDING CIRCULAR AREA.
Technical rept.,
Weidlinger (Paul) New York
Giuseppe Modiano, and Melvin L. Baron. Nov 67, 51p Rept no. TR-5
Contract DA-30-069-AMC-8 (R)

Descriptors: (*Nuclear explosions, Shock waves), (*Surfaces, Response), Loading (Mechanics), Surface properties, Elasticity, Pressure, Clay, Models (Simulations), Correlation techniques, Airburst, Attenuation, Rayleigh waves, Numerical methods and procedures.
Identifiers: Overpressure, Surface burst, Displacement (Mechanics).

The response of points at the surface of an elastic half-space due to applied normal pressures are determined for two distributions of the loads: (a) a uniform time decaying normal pressure applied over a fixed circular area on the surface $z = 0$; and (b) a time decaying pressure pulse which acts over a surface area of increasing radius. The surface displacements are obtained by means of integrations in space and time of the expressions, given by Pekeris, for the response of the medium to a concentrated point force with a step function distribution in time. A computer code has been devel-

oped for each loading case. Some typical numerical examples are presented. (Author)
AD-668 256 HC$3.00 MF$0.65

INSTRUMENTATION FOR SOIL MOTION STUDIES.
Technical rept. Jan 66-Sep 67,
Air Force Special Weapons Center Kirtland AFB N Mex
Herbert M. Fernandez, and Robert B. Bunker.
Apr 68, 60p Rept no. AFSWC-TR-67-30

Descriptors: (*Nuclear explosions, *Soil mechanics), (*Soils, Motion), Instrumentation, Simulation, Air burst, Transducers, Nuclear, Shock waves, Transients, Pressure, Acceleration, Velocity, Stresses, Strain (Mechanics), Test methods.
Identifiers: HEST (High Explosive Simulation Technique), *High explosive simulation techniques, Overpressure.

The present instrumentation being used by AFSWC in High Explosive Simulation Technique (HEST) tests is presented in this report. Outlines of some of the current developments in soil motion transducers are also included. This instrumentation is used to gather the data needed to analyze soil motion characteristics from an air-induced shock generated by a simulated nuclear blast. The physical quantities measured by this instrumentation include pressure, acceleration, velocity, displacement, soil strain, soil stress, and shock wave velocity. The instrumentation discussed in this report is mainly an adaptation of standard configurations and techniques to meet the requirement of gathering data under a severe HEST environment. This adaptation is required because the input shock generated in a HEST test is of a transient nature and of high-amplitude levels; therefore, the shock presents unique problems in instrumentation. Aspects cover the instrumentation needed to gather data from a HEST test, including the transducers, the transmission lines, the signal conditioning, and calibrate systems, and the recording and reproducing systems. (Author)
AD-668 451 HC$3.00 MF$0.65

SIGNAL DISTORTION IN ANISOTROPIC HOMOGENEOUS IONIZED MEDIA. PART I. LONGITUDINAL MAGNETIC FIELD,
Rydbeck Research Associates Fjaras (Sweden)
For primary bibliographic entry see Field 20N.
AD-668 455 HC$3.00 MF$0.65

18D. Nuclear Instrumentation

TOTAL ABSORPTION NUCLEAR CASCADE DETECTORS FOR HIGH ENERGY PHYSICS,
Stanford Univ Calif High Energy Physics Lab
R. Hofstadter. Mar 68, 20p Rept no. HEPL-556
Contract Nonr-225 (67)
Availability: To be published in Nuclear Instruments and Methods.

Descriptors: (*Radiation measurement systems, Design), Nucleons, Elementary particles, Secondary emission, Interactions, Absorption, Scintillation counters, Efficiency, Sensitivity, Decay schemes, Resolution.
Identifiers: TANC counters, Total absorption nuclear cascade counters.

A new type of detector (TANC counter) of high energy particles is proposed which operates on the principle of total absorption of all nuclear cascade products of the impinging particle. This detector will be sensitive to neutral particles (including gamma rays) as well as charged particles and will have 100% efficiency for detection. The counter can have high speed, good energy resolution, iscrimination properties, large dynamic range and virtually no limit to the highest energy detectable. Some preliminary experimental results are shown which indicate that the counter will operate as expected. (Author)
AD-668 035 Not available from CFSTI.

CONVERSION OF MICROSECOND INTERVALS OF TIME TO DIGITAL CODE,
Foreign Technology Div Wright-Patterson AFB Ohio
E. I. Rekhin, V. M. Lyaporov, and V. M. Pankratov. 7 Jul 67, 33p Rept no. FTD-MT-24-104-67
Edited machine trans. of Gosudarstvennyi Komitet po Ispolzovaniyu Atomnoi Energii. Doklady (USSR), n99 p1-19 1964.

Descriptors: (*Radiation measurement systems, Counting methods), (*Analog-to-digital converters, Design), Synchronization (Electronics), Stability, Accuracy, USSR.
Identifiers: Translations, Time delay.

The authors discuss converters designed for measuring the time interval (transit time) between some 'zero' time determined by the starting signal and the time when the detector records a particle. Accuracy in the measurement of such time intervals is analyzed with respect to factors which may cause nonlinearity in the converter. Converter characteristics are discussed and a block diagram of a converter is given. A brief description is given of a converter consisting of three functional circuits: phasing pulse generator, channel pulse shaper and converter. The various components which make up these sections are described and their important parameters are given.
AD-668 047 HC$3.00 MF$0.65

FREE RADICAL YIELDS IN POLYTETRAFLUOROETHYLENE AS THE BASIS FOR A RADIATION DOSIMETER.
Aerospace Corp El Segundo Calif Lab Operations
For primary bibliographic entry see Field 7E.
AD-668 109 HC$3.00 MF$0.65

ENERGY LOSS MECHANISMS OF PARTICLES IN SEMICONDUCTORS.
Final rept.,
Holland Hitch Co Mich
Donald W. Aitken. Feb 68, 88p
AFOSR-68-0344
Contract AF 49 (638)-1593, ARPA Order-213
Availability: Published in Various journals.

Descriptors: (*Charged particles, Interactions), (*Semiconductors, Nuclear radiation), (*Radiation measurement systems, Semiconductors), Electrons, Pions, Protons, X rays, Energy, Ionization, Quantum mechanics, Silicon, Excitation, Efficiency, Configuration, Scintillation counters, Optimization, Astrophysics, Response.
Identifiers: Energy transfer, Lithium-drifted silicon radiation detectors.

The energy loss mechanism by high energy electrons, positive pions and protons in lithium-drifted silicon radiation detectors has been investigated over the energy range from 30 MeV to 750 MeV. The energy loss spectra of the pions and protons agree very closely with the spectral shapes predicted from the ionization loss theories of Vavilov at low and intermediate velocities and Landau at the high velocity limits. A fraction of the additional energy lost through radiation by the electrons is absorbed by the detector material, causing a broadening of the resultant energy loss spectrum, as well as a shift of the most probable and average energy loss values towards higher energies. A quantum mechanical radiative correction to the ionization loss values for very fast charged particles in matter predicted by Tsytovich was not observed. At lower energies, differences in energy loss mechanisms by X rays and electrons were not observed, but differences in the charge collection efficiency of the semiconductor detector in response to these two forms of excitation were observed. These differences lead to certain precautions that must be observed when calibrating semiconductor radiation detectors for precision high energy particle investigations. A value for the energy conversion factor was measured at room temperature and at liquid nitrogen temperature. A general theory for optimizing the geometry of drilled scintillation collimators for application to space flight experiments is also developed and presented. (Author)
AD-668 385 Not available from CFSTI.

ANNUAL REPORT, JULY 1, 1967.
Brookhaven National Lab., Upton, N. Y.
For primary bibliographic entry see Field 6R.
For abstract, see NSA 22 08.
BNL-50057 HC$3.00 MF$0.65

CALCULATED ABSOLUTE DETECTION EFFICIENCIES OF CYLINDRICAL NA I (T1) SCINTILLATION CRYSTALS FOR AQUEOUS SPHERICAL SOURCES.
Aktiebolaget Atomenergi, Stockholm (Sweden).
O. Strindehag, and B. Tollander. Feb 68, 17p
AE-310

Descriptors: *Crystals, *Efficiency, *Scintillation counters, *Sodium iodides, Cylindrical bodies, Gamma rays, Radiation absorption, Radiation sources.

For abstract, see STAR 06 10.
N68-19574 HC$3.00 MF$0.65

O5S A MONTE CARLO CODE FOR CALCULATING PULSE HEIGHT DISTRIBUTIONS DUE TO MONOENERGETIC NEUTRONS INCIDENT ON ORGANIC SCINTILLATORS,
Oak Ridge National Lab., Tenn.
For primary bibliographic entry see Field 9B.
For abstract, see NSA 22 08.
ORNL-4160 HC$3.00 MF$0.65

AIR MONITOR FOR 239 PU UTILIZING SEMICONDUCTOR DETECTOR,
Dow Chemical Co., Golden, Colo. Rocky Flats Div.
Victor R. Griep. 24 Jan 68, 9p
Contract AT (29-1)-1106

Descriptors: (*Plutonium, *Monitors), (*Radiation measurement systems, Semiconductor devices), Radiological contamination, Air, Warning systems.

For abstract, see NSA 22 08.
RFP-1046 HC$3.00 MF$0.65

ESR SPECTROMETER FOR GASEOUS MEDIA. PART I. PRELIMINARY DESIGN,
California Univ., Berkeley. Lawrence Radiation Lab.
For primary bibliographic entry see Field 14B.
For abstract, see NSA 22 08.
UCRL-17306-pt-1 HC$3.00 MF$0.65

HAZARDS CONTROL PROGRESS REPORT NO. 28, MAY-AUGUST 1967.
California Univ., Livermore. Lawrence Radiation Lab.
For primary bibliographic entry see Field 6R.
For abstract, see NSA 22 08.
UCRL-50007-67-2 HC$3.00 MF$0.65

18E. Nuclear Power Plants

SOLAR CELL POWER SYSTEMS FOR APL SATELLITES.
Johns Hopkins Univ Silver Spring Md Applied Physics Lab
For primary bibliographic entry see Field 10B.
AD-668 144 HC$3.00 MF$0.65

INCIPIENT FAILURE DIAGNOSIS FOR ASSURING SAFETY AND AVAILABILITY OF NUCLEAR POWER PLANTS.
Division of Technical Information Extension (AEC), Oak Ridge, Tenn.
For primary bibliographic entry see Field 18L.
For abstract, see NSA 22 08.
CONF-671011 HC$3.00 MF$0.65

18F. Radiation, Shielding and Protection

THE INTERNAL RADIATION ENVIRONMENT OF CYLINDRICAL SPACECRAFT.
Massachusetts Inst of Tech Lexington Lincoln Lab
For primary bibliographic entry see Field 22B.
AD-668 199 Not available from CFSTI.

ACTIVATION OF SODIUM, LITHIUM, AND POTASSIUM IN COMPACT FAST REACTORS AND ITS EFFECT ON SHIELDING.
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
For primary bibliographic entry see Field 18J.
N68-20355 HC$3.00 MF$0.65

IDENTIFICATION AND YIELD OF Pd117 IN THE THERMAL-NEUTRON FISSION OF U235,
Naval Radiological Defense Lab San Francisco Calif
Herbert V. Weiss, Johnny L. Elzie, and James M. Fresco. 12 Feb 68, 14p Rept no. USNRDL-TR-68-25
Contract AT (49-2)-1167

Descriptors: (*Uranium, Fission), (*Fission products, *Palladium), Nuclear structure, Fission product activity, Identification, Separation, Radioactive isotopes, Half life, Nuclear isobars, Thermal neutrons, Neutron reactions.
Identifiers: Nuclear charge.

As part of a study of nuclear charge distribution in the region of symmetric fission, the existence and cumulative fission yield of 117Pd were sought. Palladium was isolated free from silver and cadmium at different times after fission and the quantity of descendant 117Cd activity was measured. A half-life for 117Pd of 5.0 +0.5 or -0.7 sec was derived from these data. Through a comparison of 117Cd activity produced by 117Pd with the total 117Cd activity produced by all isobars, a cumulative fractional chain yield of 0.682 was computed for 117Pd. From this yield the most probable nuclear charge (Zp) for the 117-mass chain was estimated. (Author)
AD-668 022 HC$3.00 MF$0.65

THERMAL-NEUTRON FISSION OF 235U: IDENTIFICATION AND FRACTIONAL CHAIN YIELD OF 77Ga,
Naval Radiological Defense Lab San Francisco Calif
Leon Wish. 11 Feb 68, 24p Rept no. USNRDL-TR-68-35
Contract AT (49-2)-1167

Descriptors: (*Uranium, Fission), (*Fission products, *Gallium), Thermal neutrons, Radioactive isotopes, Separation, Ion exchange, Fission product activity, Decay schemes, Half life.

The study of nuclear charge dispersion in the light-fission-product region from thermal-neutron irradiation of 235U was begun with measurements on mass chain 77. An ion exchange procedure was developed which rapidly separated Ga from its daughter products, Ge and As. Ga separations were made at various times after fission and the Ge daughter activities were isolated and measured. From these activities 77Ga and 78Ga were indirectly identified as fission products. The half-life of 77Ga was determined to be 17.1 plus or minus 1.5 sec and that of 78Ga was estimated to be about 4 sec. The branching ratio of 77Ga for formation of 77mGe and 77gGe was obtained from measurements of the 39-hr 77As activity at the time when the 54-sec 77mGe and the 11.3-hr 77gGe had each mostly decayed. Values obtained for decay to 77mGe and 77gGe are 0.88 plus or minus 0.02 and 0.12 plus or minus 0.02, respectively. The fractional cumulative yield of 77Ga was determined as 57.3 plus or minus 1.4 percent. (Author)
AD-668 329 HC$3.00 MF$0.65

RUTHENIUM DIOXIDE-OXYGEN-RUTHENIUM TETROXIDE EQUILIBRIUM,
Idaho Nuclear Corp., Idaho Falls.
For primary bibliographic entry see Field 7E.
For abstract, see NSA 22 08.
IN-1013 HC$3.00 MF$0.65

CALCULATIONS OF HEIGHT OF VENTILATION STACKS FOR DISCHARGING AIR CONTAMINATED WITH RADIOACTIVE MATERIALS,
Joint Publications Research Service, Washington, D. C.
For primary bibliographic entry see Field 13B.
JPRS-43977 HC$3.00 MF$0.65

18H. Radioactivity

AN ANALYSIS OF ROOF WASHDOWN VERSUS APPLIED SHIELDING AS A FALLOUT COUNTERMEASURE.
Stanford Research Inst Menlo Park Calif
For primary bibliographic entry see Field 13M.
AD-668 220 HC$3.00 MF$0.65

THE INFLUENCE OF SUBSTRATE TEMPERATURE ON THE STICKING COEFFICIENT OF ZINC ON GLASS,
Goucher Coll Towson Md
For primary bibliographic entry see Field 7D.
AD-668 252 HC$3.00 MF$0.65

RADIATION EFFECTS ON THIN FILM INTEGRATED CIRCUIT ELEMENTS.
North American Rockwell Corp Anaheim Calif Autonetics Div
For primary bibliographic entry see Field 9E.
AD-668 257 HC$3.00 MF$0.65

GAMMA RAY FIELDS ABOVE ROUGH CONTAMINATED SURFACES,
Naval Radiological Defense Lab San Francisco Calif
Charles B. Bennett, Willard S. Kehrer, Richard R. Soule, and James P. Corn. 6 May 68, 211p Rept no. USNRDL-TR-68-20

Descriptors: (*Gamma rays, Intensity), (*Surface properties, *Dose rate), Radioactive fallout, Surface roughness, Radiological contamination, Exposure, Gold, Sand, Gravel, Glass, Dosimeters, Ionization, Radioactive decay, Mathematical analysis, Lithium fluorides, Particle size, Materials, Tables.
Identifiers: Lutetium.

An experiment was performed to determine the effect of surface roughness on the gamma radiation exposure rate above fallout-contaminated surfaces. Gamma radiation measurements were made at heights of 1, 4, 8, and 16 meters and at horizontal distances of 0 to 128 meters from the center of a 10 ft diameter circle of Au198 contamination on various surfaces, from plate glass to 5/8 in. gravel. Two supplemental tests were conducted with Lu177 contamination on plate glass and 5/8 in. gravel in an attempt to establish the energy dependence of the roughness effect. The measured values were numerically integrated to approximate the gamma exposure field above a uniformly contaminated infinite plane of the base material. For each surface material, the intensity of the gamma exposure field (in Roentgens per hour for a contamination density of 1 curie per square meter, r/hr per Ci/sq m was divided by the gamma intensity over a contaminated plate glass surface to obtain a surface roughness ratio for each of 4 heights. The 1-meter values are presented. (Author)
AD-668 327 HC$3.00 MF$0.65

ENERGY LOSS MECHANISMS OF PARTICLES IN SEMICONDUCTORS.
Holland Hitch Co Mich
For primary bibliographic entry see Field 18D.
AD-668 385 Not available from CFSTI.

FAST RECOVERY OF ELECTRON IRRADIATED GERMANIUM,
Ecole Normale Superieure Paris (France) Laboratoire de Physique
For primary bibliographic entry see Field 20L.
AD-668 468 HC$3.00 MF$0.65

LOW TEMPERATURE IRRADIATION AND ANNEALING OF N-TYPE GERMANIUM; EFFECTS OF OPTICAL BLEACHING,
Ecole Normale Superieure Paris (France) Laboratoire de Physique
For primary bibliographic entry see Field 20L.
AD-668 469 HC$3.00 MF$0.65

PHOTOCONDUCTIVITY SPECTRA OF LOW-TEMPERATURE ELECTRON-IRRADIATED GERMANIUM,
Ecole Normale Superieure Paris (France) Laboratoire de Physique
For primary bibliographic entry see Field 20L.
AD-668 470 HC$3.00 MF$0.65

FALLOUT PROGRAM.
Quarterly summary rept. 1 Sep-1 Dec 67.
New York Operations Office (AEC), N. Y. Health and Safety Lab.
1 Jan 68, 204p

Descriptors: (*Radioactive fallout, Data), Distribution, Sampling, Strontium, Radioactive isotopes, Atmospheric precipitation.

For abstract, see NSA 22 08.
HASL-184 HC$3.00 MF$0.65

PROPERTIES OF THE 321 KE V 9/2 LEVEL IN 125 TE.
Polish Academy of Sciences, Warsaw. Inst. of Nuclear Research.
J. Kownacki, J. Ludziejewski, and M. Moszynski. 1967, 7p REPT.-865/1A/PL
Subm- Submitted for Publication

Descriptors: *Half life, *Radioactive decay, *Tellurium isotopes, Energy levels, Excitation, Scintillation counters, Transition probabilities.

For abstract, see STAR 06 10.
N68-20448 HC$3.00

18I. Reactor Engineering and Operation

REACTOR DEVELOPMENT PROGRAM PROGRESS REPORT, DECEMBER 1967.
Argonne National Lab., Ill.
31 Jan 68, 168p
Contract W-31-109-eng-38

Descriptors: (*Reactor operation, Scientific research), Reactor system components, Reactor safety systems, Reactor coolants, Reactor control, Reactor fuels, Reactor theory, Chemical engineering, Plutonium.

For abstract, see NSA 22 08.
ANL-7403 HC$3.00 MF$0.65

AN EVALUATION OF THE APPLICABILITY OF EXISTING DATA TO THE ANALYTICAL DESCRIPTION OF A NUCLEAR-REACTOR ACCIDENT. OCTOBER-DECEMBER 1967.
Quarterly progress rept. Oct-Dec 67,
Battelle Memorial Inst., Columbus, Ohio.
David L. Morrison, Wayne A. Carbiener, Robert L. Ritzman, and Richard S. Denning. 1 Jan 68, 28p
Contract W-7405-eng-92

Descriptors: (*Reactor accidents, Reactor coolants), (*Nuclear power plants, Safety), Boiling water reactors, Pressurized water reactors, Heat transfer, Reactor kinetics, Reactor fuels.
Identifiers: Computer analysis.

For abstract, see NSA 22 08.
BMI-1825 HC$3.00 MF$0.65

ANNUAL REPORT, JULY 1, 1967.
Brookhaven National Lab., Upton, N. Y.
For primary bibliographic entry see Field 6R.
For abstract, see NSA 22 08.
BNL-50057 HC$3.00 MF$0.65

THE PACIFIC NORTHWEST LABORATORY HYBRID COMPUTER SYSTEM,
Battelle-Northwest, Richland, Wash. Pacific Northwest Lab.
M. D. Erickson. Jan 68, 60p
Contract AT (45-1)-1830

Descriptors: (*Reactor control, Analog-digital computers), (*Analog-digital computers, Design), Multiplex, Analog-to-digital converters, Digital-to-analog converters, Programming (Computers), Interfaces, Real time, Subroutines, Automation.
Identifiers: Fast flux test facility.

For abstract, see NSA 22 08.
BNWL-538 HC$3.00 MF$0.65

REACTIVITY WORTH OF A CENTRAL SAFETY ROD WITH AND WITHOUT AN INTERNAL SCATTERER,
Battelle-Northwest, Richland, Wash. Pacific Northwest Lab.
For primary bibliographic entry see Field 20H.
For abstract, see NSA 22 08.
BNWL-618 HC$3.00 MF$0.65

INCIPIENT FAILURE DIAGNOSIS FOR ASSURING SAFETY AND AVAILABILITY OF NUCLEAR POWER PLANTS.
Division of Technical Information Extension (AEC), Oak Ridge, Tenn.
For primary bibliographic entry see Field 18L.
For abstract, see NSA 22 08.
CONF-671011 HC$3.00 MF$0.65

A PROPOSAL FOR A REPETITIVELY PULSED TEST FACILITY (RPTF),
Idaho Nuclear Corp., Idaho Falls.
For primary bibliographic entry see Field 18M.
For abstract, see NSA 22 08.
IN-1149 HC$3.00 MF$0.65

S8DR ACTUATOR INTERIM REPORT,
Atomics International, Canoga Park, Calif.
W. G. Long. 30 Dec 67, 35p
Contract AT (04-3)-701

Descriptors: (*Nuclear reactors, Design), Actuators, High-temperature research, Rotary switches, Performance (Engineering), Shock (Mechanics), Vibration, Electric insulation, Torque, Space simulation chambers, Vacuum, Coatings, Surface properties, Environmental tests, Coils.

For abstract, see NSA 22 08.
NAA-SR-12605 HC$3.00 MF$0.65

REACTIVITY EFFECTS CAUSED BY RADIAL POWER FLATTENING IN A SMALL, FAST-SPECTRUM REACTOR.
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
C. L. Whitmarsh, Jr., Apr 68, 13p NASA-TN-D-4459
Contract 120-27-06-05-22

Descriptors: *Gas cooled reactors, *Nuclear electric power generation, *Reactivity, Nuclear energy, Nuclear fuels, Nuclear propulsion, Nuclear research, Power efficiency, Reactor cores, Reflectors, Uranium oxides.

For abstract, see STAR 06 10.
N68-19925 HC$3.00 MF$0.65

INDEX TO NUCLEAR SAFETY. A TECHNICAL PROGRESS REVIEW BY CHRONOLOGY, PERMUTED TITLE, AND AUTHOR. VOL. 1, NO. 1 THROUGH VOL. 8, NO. 6.
Oak Ridge National Lab., Tenn.
Feb 68, 89p
Contract W-7405-eng-26

Descriptors: (*Nuclear radiation, *Safety), Indexes, Nuclear reactors, Radiological contamination, Abstracts, Radiological dosage, Radiation monitors, Radiation hazards, Radiation effects, Radiation damage.

For abstract, see NSA 22 08.
ORNL-NSIC-41 HC$3.00 MF$0.65

18J. Reactor Materials

INVESTIGATION OF HEAT TRANSFER TO ORGANIC LIQUIDS,
Foreign Technology Div Wright-Patterson AFB Ohio
L. S. Sterman, and V. V. Petukhov. 15 Sep 67, 18p Rept no. FTD-MT-67-45
Edited machine trans. of mono. Issledovaniya po Primeneniyu Organicheskikh Teplonositelei-Zamedlitelei v Energeticheskikh Reaktorakh, Moscow, 1964 p95-106.

Descriptors: (*Reactor coolants, Heat transfer), (*Organic cooled reactors, Reactor coolants), Polycyclic compounds, Heat flux, Heat transfer coefficients, Reynolds number, USSR.
Identifiers: Biphenyls, Isopropyl biphenyls, Translations.

The heat-transfer coefficients to monoisopropylbiphenyl and biphenyl during variations in the process parameters were determined, and the results were compared with theoretical equations of different types. These coefficients were determined during turbulent flow in tubes without a change in the state of aggregation of the organic fluids. The heat-transfer coefficients to monoisopropylbiphenyl were determined at heat fluxes of 200,000, 500,000, and 860,000 Kcal/sq m hr and at circulation rates of 4, 6, 10 and 15 m/sec., and those to biphenyl were determined at a heat flux of 300,000 Kcal/sq m hr and circulation rates of 4 and 6 m/sec. Under these conditions, the Reynolds number was found to fall within 25,000 - 420,000, and the heat-transfer coefficient varied from 3,000 to 18,000 Kcal/sq m hr deg. C. (Author)
AD-668 507 HC$3.00 MF$0.65

THE DEVELOPMENT OF A DESIGN AND FABRICATION METHOD FOR PLUTONIUM-BEARING ZERO-POWER REACTOR FUEL ELEMENTS,
Argonne National Lab., Ill.
A. B. Shuck, H. F. Jelinek, and A. G. Hins. Aug 67, 92p
Contract W-31-109-eng-38

Descriptors: (*Reactor fuel elements, Manufacturing methods), Design, Costs, Radiation measurement systems, Welding, Uranium alloys, Plutonium alloys, Molybdenum alloys.
Identifiers: Zero-power reactors.

For abstract, see NSA 22 08.
ANL-7313 HC$3.00 MF$0.65

REACTOR DEVELOPMENT PROGRAM PROGRESS REPORT, DECEMBER 1967.
Argonne National Lab., Ill.
For primary bibliographic entry see Field 18I.
For abstract, see NSA 22 08.
ANL-7403 HC$3.00 MF$0.65

PROGRESS RELATING TO CIVILIAN APPLICATIONS DURING JULY THROUGH SEPTEMBER 1967,
Battelle Memorial Inst., Columbus, Ohio.
For primary bibliographic entry see Field 18M.
For abstract, see NSA 22 08.
BMI-1819 HC$3.00 MF$0.65

THE DEVELOPMENT OF POWDERED URANIUM-ALUMINIDE COMPOUNDS FOR USE AS NUCLEAR REACTOR FUELS,
Idaho Nuclear Corp., Idaho Falls.
G. W. Gibson. Dec 67, 82p
Contract AT (10-1)-1230

Descriptors: (*Reactor fuels, *Powder metals), Intermetallic compounds, Uranium alloys, Aluminum alloys, Reactor fuel plates.

For abstract, see NSA 22 08.
IN-1133 HC$3.00 MF$0.65

EFFECTS OF MATRIX GASES ON THE ALPHA IONIZATION GAS ANALYZER FOR URANIUM HEXAFLUORIDE,
Oak Ridge Gaseous Diffusion Plant, Tenn.
For primary bibliographic entry see Field 7E.
For abstract, see NSA 22 08.
K-1719 HC$3.00 MF$0.65

SPECTROPHOTOMETRIC DETERMINATION OF VANADIUM IN PLUTONIUM-VANADIUM ALLOYS,
Los Alamos Scientific Lab., N. Mex.
For primary bibliographic entry see Field 7E.
For abstract, see NSA 22 08.
LA-3843 HC$3.00 MF$0.65

ON OXIDE, NITRIDE AND CARBIDE COMPOUNDS OF U- CE- ZR.
des Oxydes, Nitrures Et Carbures Ternaires de U-ce-*zr*
Kernforschungszentrum, Karlsruhe (West Germany).
H. Holleck, and W. Wagner. Sep 67, 25p KFK-643, SM-98/13
Sep. 1967 Coll- 25 P Refs Lang- in French Conf- Presented At Conf. on Thermodyn. of Nucl. Mater. With Emphasis on Soln. System, Vienna, 4-8 Sep. 1967 Spon- Supported in Part By Euratom

Descriptors: *Cerium compounds, *Radiography, *Ternary systems, *Uranium compounds, *Zirconium compounds, Carbides, Nitrides, Oxides, Solubility, Uranium.

For abstract, see STAR 06 10.
N68-19527 HC$3.00 MF$0.65

FABRICATION OF INSTRUMENTED FUEL ELEMENTS AND IN-PILE CAPSULES.
Oak Ridge National Lab., Tenn.
E. A. Franco-ferreira, and L. C. Williams. Dec 67, 33p ORNL-4190
Contract W-7405-ENG-26

Descriptors: *Nuclear fuel elements, *Reactor cores, *Thermocouples, *Welding, Cladding, Experimental gas cooled reactors, Fabrication, Refractory metal alloys, Welded joints.

For abstract, see STAR 06 10.
N68-19664 HC$3.00 MF$0.65

ACTIVATION OF SODIUM, LITHIUM, AND POTASSIUM IN COMPACT FAST REACTORS AND ITS EFFECT ON SHIELDING.
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
L. Soffer. Apr 68. 23p NASA-TM-X-1512
Contract 120-27-06-07-22

Descriptors: *Fast nuclear reactors, *Lithium, *Neutron activation analysis, *Potassium, *Radiation shielding, *Sodium, Cooling systems, Neutron flux density.

For abstract, see STAR 06 10.
N68-20355 HC$3.00 MF$0.65

18K. Reactor Physics

SEQUENTIAL STATE AND PARAMETER ESTIMATION IN DISCRETE NONLINEAR SYSTEMS.
Aerospace Corp Patrick AFB Fla Eastern Test Range Office
For primary bibliographic entry see Field 12B.
AD-668 116 HC$3.00 MF$0.65

ANL-CANDID A TWO-DIMENSIONAL, DIFFUSION-THEORY CODE BASED ON CANDID2D,
Argonne National Lab., Ill.
G. K. Leaf, A. S. Kennedy, and G. C. Jensen. Sep 67, 202p
Contract W-31-109-eng-38

Descriptors: (*Reactor theory, Programming (Computers)), Neutron transport theory, Iterations, Perturbation theory, Subroutines, Tables.

For abstract, see NSA 22 08.
ANL-7305 HC$3.00 MF$0.65

REACTOR DEVELOPMENT PROGRAM PROGRESS REPORT, DECEMBER 1967.
Argonne National Lab., Ill.
For primary bibliographic entry see Field 18I.
For abstract, see NSA 22 08.
ANL-7403 HC$3.00 MF$0.65

2DB A TWO DIMENSIONAL DIFFUSION-BURNUP CODE FOR FAST REACTOR ANALYSIS,
Battelle-Northwest, Richland, Wash. Pacific Northwest Lab.
For primary bibliographic entry see Field 9B.
For abstract, see NSA 22 08.
BNWL-640 HC$3.00 MF$0.65

A PROPOSAL FOR A REPETITIVELY PULSED TEST FACILITY (RPTF),
Idaho Nuclear Corp., Idaho Falls.
For primary bibliographic entry see Field 18M.
For abstract, see NSA 22 08.
IN-1149 HC$3.00 MF$0.65

A NUMERICAL STUDY OF EXCURSIONS IN UHTREX LOADED WITH STANDARD FUEL ELEMENTS,
Los Alamos Scientific Lab., N. Mex.
John C. Vigil. Sep 67, 15p
Contract W-7405-eng-36

Descriptors: (*Reactor kinetics, Mathematical models), Feedback, Neutron transport theory, Transients, Reactor fuel elements, Prompt neutrons, Reactor cores, Heat transfer.
Identifiers: UHTREX (Ultra high temperature reactor experiment).

For abstract, see NSA 22 08.
LA-3789 HC$3.00 MF$0.65

MODELS FOR CALCULATING EFFECTS OF THERMAL MODERATOR MOTION,
California Univ., Livermore. Lawrence Radiation Lab.
Eugene Canfield. 15 Jul 67, 23p

Descriptors: (*Reactor moderators, Nuclear cross sections), Neutron transport theory, Mathematical models.

For abstract, see NSA 22 08.
UCRL-50323 HC$3.00 MF$0.65

18L. Reactors (Power)

INCIPIENT FAILURE DIAGNOSIS FOR ASSURING SAFETY AND AVAILABILITY OF NUCLEAR POWER PLANTS.
Division of Technical Information Extension (AEC), Oak Ridge, Tenn.
Jan 68, 392p
Prepared in cooperation with Oak Ridge National Lab., Tenn. Proceedings of the conference held at Gatlinburg, Tennessee, October 30-November 1, 1967.

Descriptors: (*Power reactors, Safety), (*Nuclear power plants, Reactor operation), (*Reactor operation, Safety), Failure (Mechanics), Reactor system components, Non-destructive testing, Reactor accidents, Reactor control, Reactor inspection, Abundance, Reliability, Malfunctions, Anomalies, Radiation monitors.
Identifiers: On-line systems.

For abstract, see NSA 22 08.
CONF-671011 HC$3.00 MF$0.65

18M. Reactors (Non-Power)

HEAVY WATER ORGANIC COOLED REACTOR. DEVELOPMENT OF SAP-STEEL PRESSURE TUBE TRANSITION JOINTS FOR THE HWOCR,
Atomics International, Canoga Park, Calif.
M. K. Sanders. 15 Jan 68, 7p
Contract AT (38-1)-430
Prepared in cooperation with Combustion Engineering, Inc., Windsor, Conn. Nuclear Div.

Descriptors: (*Heavy water reactors, Manufacturing methods), Stainless steel, Design, Pressurized water reactors, Organic compounds, Tensile properties, Performance (Engineering), Rolling (Metallurgy), Pipes, Metal joints.

For abstract, see NSA 22 08.
AI-CE-46-Add. HC$3.00 MF$0.65

REACTOR DEVELOPMENT PROGRAM PROGRESS REPORT, DECEMBER 1967.
Argonne National Lab., Ill.
For primary bibliographic entry see Field 18I.
For abstract, see NSA 22 08.
ANL-7403 HC$3.00 MF$0.65

PROGRESS RELATING TO CIVILIAN APPLICATIONS DURING JULY THROUGH SEPTEMBER 1967,
Battelle Memorial Inst., Columbus, Ohio.
Donald L. Keller. 1 Oct 67, 51p
Contract W-7405-eng-92

Descriptors: (*Nuclear reactors, Reports), Uranium, Plutonium, Reactor fuels, Construction materials, Physical properties, Vaporization, Quantitative analysis, Mechanical properties, Fracture (Mechanics), Radiation effects, Nuclear particles, Fission, Cladding, Manufacturing methods, Sintering.

For abstract, see NSA 22 08.
BMI-1819 HC$3.00 MF$0.65

A PROPOSAL FOR A REPETITIVELY PULSED TEST FACILITY (RPTF),
Idaho Nuclear Corp., Idaho Falls.
R. G. Fluharty, F. B. Simpson, and G. J. Russell.
Dec 67, 119p
Contract AT (10-1)-1230

Descriptors: (*Nuclear reactors, Feasibility studies), Construction, Reactor fuels, Neutrons, Mathematical analysis, Nuclear particles, Sources, Equations of state, Physical properties, Test reactors.

For abstract, see NSA 22 08.
IN-1149 HC$3.00 MF$0.65

ZERO-POWER PHYSICS EXPERIMENTS ON THE MOLTEN-SALT REACTOR EXPERIMENT,
Oak Ridge National Lab., Tenn.
V. E. Prince, S. J. Ball, and J. R. Engel. Feb 68, 60p
Contract W-7405-eng-26

Descriptors: (*Fused salts cooled reactors, Measurement), Temperature, Nuclear reactions, Pressure, Uranium, Neutrons, Reactor fuels, Mathematical analysis, Instrumentation, Rods, Frequency, Radioactive series, Nuclear physics laboratories, Radioactive isotopes.

For abstract, see NSA 22 08.
ORNL-4233 HC$3.00 MF$0.65

18N. SNAP Technology

ELECTROCHEMICAL CORROSION STUDIES OF GALVANICALLY COUPLED SNAP-21 MATERIALS,
Naval Radiological Defense Lab San Francisco Calif
Donald A. Kubose, and Herman I. Cordova. 15 Jan 68, 36p Rept no. USNRDL-TR-68-26

Descriptors: (*Reactor materials, *Corrosion), Sea water, Electrochemistry, Electrolytic cells, Radioactive isotopes, Strontium, Accidents, Radiological contamination, Aluminum, Copper, Nickel, Stainless steel, Tantalum, Titanium alloys, Uranium alloys, Molybdenum alloys, Nickel alloys, Iron alloys.
Identifiers: SNAP, SNAP-21, Hastelloy (Alloys), Stainless steel 304, Titanium alloy 621, Uranium alloy 8Mo.

Electrochemical corrosion rate measurements on materials used in the SNAP-21 radioisotopically-fueled power system have been made in seawater at room temperature. The materials examined included aluminum, copper, Hastelloy C, Hastelloy X, nickel, 3-4 stainless steel, tantalum, titanium-621 alloy and uranium-8% molybdenum alloy. The normal corrosion rate of each material was measured by means of galvanostic polarization techniques. A galvanic series of the materials in seawater was determined and the galvanic currents between galvanically coupled materials were measured with a zero-resistance ammeter circuit. The effect of galvanic coupling of construction materials of the SNAP-21 system does not materially change the containment time of the Sr-90 fuel in the corrosive seawater environment. (Author)
AD-668 161 HC$3.00 MF$0.65

SNAP-23A PROGRAM. PHASE I. THERMOELECTRIC CONVERTER DEVELOPMENT PROGRAM.
Minnesota Mining and Mfg. Co., St. Paul.
For primary bibliographic entry see Field 10B.
For abstract, see NSA 22 08.
MMM-3824-0013 HC$3.00 MF$0.65

S8DR ACTUATOR INTERIM REPORT,
Atomics International, Canoga Park, Calif.

For primary bibliographic entry see Field 18I.
For abstract, see NSA 22 08.
NAA-SR-12605 HC$3.00 MF$0.65

SNAP-23A. PHASE I. 1967.
Quarterly progress rept. 1 Sep-30 Nov 67,
Westinghouse Electric Corp., Pittsburgh, Pa. Astronuclear Lab.
S. Cerni. 15 Dec 67, 119p
Contract AT (30-1)-3800

Descriptors: (*Power reactors, Spaceborne), Radioactive isotopes, Power supplies, Design, Materials, Tests, Systems engineering.
Identifiers: SNAP-23A.

For abstract, see NSA 22 08.
WANL-3800-9 HC$3.00 MF$0.65

19. ORDNANCE

19A. Ammunition, Explosives, and Pyrotechnics

LOW-POWER EXPLOSION OF THIN-FILM RESISTORS,
Harry Diamond Labs Washington D C
For primary bibliographic entry see Field 9A.
AD-667 949 HC$3.00 MF$0.65

M532 BATTERY TELEMETER,
Harry Diamond Labs Washington D C
For primary bibliographic entry see Field 9F.
AD-667 950 HC$3.00 MF$0.65

SINGLE-WIRE TORSIONAL PENDULUMS AND THEIR USE IN THE MEASUREMENT OF MOMENTS OF INERTIA.
Memorandum rept.,
Ballistic Research Labs Aberdeen Proving Ground Md
R. W. Deas, and W. M. Werner. Dec 67, 40p
Rept no. BRL-MR-1891

Descriptors: (*Bodies of revolution, *Moment of inertia), Torsion, Measurement, Mathematical prediction, Projectiles, Artillery, Oscillation, Test methods, Calibration, Center of gravity, Data processing systems, Computer programs, Flow charting.
Identifiers: *Torsional pendulums, Computer analysis.

The theory of single-wire torsional pendulums, including second order effects, is discussed. The theory is applied to the use of torsional pendulums in measuring moments of inertia. Two types of torsional pendulums designed for moment of inertia measurements are described: one for odd-shaped bodies and one for artillery projectiles. A data reduction program for digital computers is included. (Author)
AD-667 963 HC$3.00 MF$0.65

ANALYSIS OF WATER WAVES GENERATED EXPLOSIVELY AT THE UPPER CRITICAL DEPTH.
Final rept.,
Urs Corp Burlingame Calif
A. R. Kriebel, Jan 68, 94p Rept no. URS-679-1
Contract N00014-67-C-0451

Descriptors: (*TNT, Underwater explosions), (*Water waves, *Explosion effects), Surface burst, Deep water, Shallow water, Propagation, Shock waves, Models (Simulations), Energy, Detonation waves, Mathematical analysis, Nuclear explosions, Reflection, Correlation techniques.
Identifiers: *Critical depth, Wave trains (Marine).

A theoretical analysis is made of water surface waves generated by explosive spheres partially submerged near the upper critical depth of burst (UCD). The analysis is based on engineering approximation, and the results are compared with extant data. The analysis is the first part of a combined theoretical-experimental study of explosive wave generation. The analysis indicates that anomalous reflection of the water shock wave from the water surface near the charge may restrict the flow out of the expanding cavity for depths of burst near the UCD and that this may be the main reason for the UCD effect. It seems reasonable to suppose that the shock wave from a nuclear explosion (located at the center of an equivalent sphere of TNT at the UCD) might be similar to that from TNT after the steam cavity has grown to roughly the size of the TNT sphere. Therefore, if it is established experimentally that anomalous reflection of the shock wave is the cause of the UCD effect for TNT, then a similar effect might be expected for nuclear explosions. (Author)
AD-668 179 HC$3.00 MF$0.65

A MODIFIED PICATINNY ARSENAL EXPLOSION TEMPERATURE TEST FOR DETERMINING THERMAL SENSITIVITY OF EXPLOSIVES UNDER CONTROLLED VAPOR EXPOSURES.
Picatinny Arsenal Dover N J Feltman Research Labs
For primary bibliographic entry see Field 19D.
AD-668 230 HC$3.00 MF$0.65

19B. Bombs

MEDIUM FREQUENCY CONJUGATE ECHOES OBSERVED ON TOPSIDE-SOUNDER DATA,
Defence Research Telecommunications Establishment Ottawa (Ontario) Radio Physics Lab
For primary bibliographic entry see Field 4A.
AD-668 012 Not available from CFSTI.

19C. Combat Vehicles

DEVELOPMENT OF ELEVATION SERVOMECHANISM, TI.
Technical information rept.
Pittsburgh Univ., Pa.
Feb 57, 6p
ORDP-9-8-71L
Contract DA-36-034-AMC-3785 (X)

Descriptors: (*Tanks (Combat vehicles), *Fire control system components), (*Servomechanisms, *Elevating gear), Gun auxiliary equipment, Drives, Range finding, Synchros, Voltage amplifiers, Electronic equipment, Power supplies, Power transformers, Reports.
Identifiers: T-43 tanks.

The T43E2 120-mm gun tank is equipped with a fire control system that gives it greater combat effectiveness than its predecessor, the T43E1. This improvement is largely the result of firing data being continously and automatically transmitted to the sights. In this system, improved gun-laying accuracy is achieved by using a two-speed electromechanical servo system for the gun-to-range-finder drive, and by separating the periscope and range finder elevation linkages. The inherent high accuracy of the two-speed servo system makes it particularly applicable to a vehicle as large as the T43E2. Moreover, it eliminates the mechanical linkages and shafts between widely separated instruments that were responsible for the marginal accuracy of the fire control system in the earlier T43E1 tank. A brief description of the T43E2's fire control system is found in TIR 9-8-3A8.
AD-452 148 HC$3.00

THE INFLUENCE OF BREECH ORIENTATION OF THE XM150E4 GUN ON THE LOADER'S TASK AS RELATED TO THE M60A1E1 TANK.
Human Engineering Labs Aberdeen Proving Ground Md
For primary bibliographic entry see Field 19F.
AD-668 229 HC$3.00 MF$0.65

19D. Explosions, Ballistics, and Armor

THE DIURNAL TIDE NEAR THE STRATOPAUSE OVER WHITE SANDS MISSILE RANGE, NEW MEXICO,
Atmospheric Sciences Lab White Sands Missile Range N Mex
For primary bibliographic entry see Field 4B.
AD-667 909 HC$3.00 MF$0.65

PRELIMINARY STUDY OF THE WIND FREQUENCY RESPONSE OF THE HONEST JOHN M50 TACTICAL ROCKET,
Atmospheric Sciences Lab White Sands Missile Range N Mex
For primary bibliographic entry see Field 19G.
AD-667 910 HC$3.00 MF$0.65

ACOUSTICAL, METEOROLOGICAL, AND SEISMIC DATA REPORT - SOTRAN V AND VI,
Atmospheric Sciences Lab White Sands Missile Range N Mex
Ralph H. Rohwer. Oct 67, 98p
ECOM-5162

Descriptors: (*Sound transmission, *Meteorological parameters), (*Seismic waves, Data), (*Explosions, Detection), Airburst, Sounding rockets, Detonation waves, Nuclear explosions, Simulation, Detection, Sound signals, Velocity, Spectrum signatures, Atmospheric temperature, Barometric pressure, Wind, Humidity, Refractive index.
Identifiers: SOTRAN.

The report, the third of the SOTRAN series, is a compilation of data acquired from the detonation of two 50-ton stacks of TNT at White Sands Missile Range on 15 and 24 June 1967. Meteorological, acoustical, and seismic data are presented along with other general information about the events. Octave filter runs have been made from available tapes to show the general character of the acoustics data, but no attempt has been made to derive results. The report serves as a summary of the data available for those who wish to make further studies of the two explosions. (Author)
AD-667 915 HC$3.00 MF$0.65

ROCKET MEASUREMENTS OF ATMOSPHERIC OZONE,
Atmospheric Sciences Lab White Sands Missile Range N Mex
For primary bibliographic entry see Field 4A.
AD-667 919 HC$3.00 MF$0.65

METEOROLOGICAL REQUIREMENTS FOR THE AEROBEE - 350,
Atmospheric Sciences Lab White Sands Missile Range N Mex
For primary bibliographic entry see Field 4A.
AD-667 921 HC$3.00 MF$0.65

A COMPUTER STUDY OF THE WIND FREQUENCY RESPONSE OF UNGUIDED ROCKETS,
Atmospheric Sciences Lab White Sands Missile Range N Mex
For primary bibliographic entry see Field 4B.
AD-667 922 HC$3.00 MF$0.65

UNGUIDED ROCKET BALLISTICS METEOROLOGY CONFERENCE, 31 OCTOBER-2 NOVEMBER 1967, ADDENDUM,
Atmospheric Sciences Lab White Sands Missile Range N Mex
For primary bibliographic entry see Field 4B.
AD-667 928 HC$3.00 MF$0.65

ANALYSIS OF WATER WAVES GENERATED EXPLOSIVELY AT THE UPPER CRITICAL DEPTH.
Urs Corp Burlingame Calif

For primary bibliographic entry see Field 19A.
AD-668 179 HC$3.00 MF$0.65

A MODIFIED PICATINNY ARSENAL EXPLOSION TEMPERATURE TEST FOR DETERMINING THERMAL SENSITIVITY OF EXPLOSIVES UNDER CONTROLLED VAPOR EXPOSURES.
Technical rept.,
Picatinny Arsenal Dover N J Feltman Research Labs
Thomas C. Castorina, Jerome Haberman, Everett W. Dalrymple, and Andrew F. Smetana. Apr 68, 28p
PA-TR-3690

Descriptors: (*Explosive materials, Test methods), Thermal properties, Sensitivity, Water vapor, Freons, RDX, Lead compounds, Azides, Surface properties, Heat of activation, Heat transfer.
Identifiers: Lead azide.

The Picatinny Arsenal explosion temperature test was modified to study the effect produced on the induction period by vapors in contact with the surface of explosives. The test was found to be reproducible and significantly responsive to changes in times to explosion and activation energy of RDX, PbN6, and RDX/PbN6 mixture exposed to H2O and Freon vapors. These changes are postulated to be a function of vapor-surface interactions which correspondingly alter the rate of surface heat dissipation and mechanism of chemical reactions which initiate explosive decomposition. (Author)
AD-668 230 HC$3.00 MF$0.65

BLAST ATTENUATION STUDIES IN DIVIDING WALL PROTECTIVE CONSTRUCTION,
Army Engineer Waterways Experiment Station Vicksburg Miss
For primary bibliographic entry see Field 13M.
AD-668 237 HC$3.00 MF$0.65

EVALUATION OF METHODS OF ATTENUATING BLAST PRESSURES ON WALLS,
Army Engineer Waterways Experiment Station Vicksburg Miss
or primary bibliographic entry see Field 13M.
AD-668 238 HC$3.00 MF$0.65

BLAST CASUALTY PREDICTION-PAST, PRESENT, AND FUTURE.
Cosmic Inc Bethesda Md
For primary bibliographic entry see Field 6U.
AD-668 342 HC$3.00 MF$0.65

NORMAL REFLECTION OF A PLANE GASEOUS DETONATION WAVE IN A TUBE,
National Research Council of Canada, Ottawa (Ontario). Div. of Mechanical Engineering.
A. H. Makomaski. Apr 67, 35p DME-MT-58 NRC-9667

Descriptors: (*Detonation waves, Reflection), Pipes, Shock waves, Analysis, Gases, Explosions, Hydrogen, Oxygen, Computer programs, Trajectories, Canada.

A method, together with a FORTRAN IV computer program, is presented for the calculation of the trajectory and properties of a shock wave generated on normal reflection of an idealized gaseous detonation wave in a tube. The detonation wave is assumed to be formed by energetic ignition resulting in zero detonation induction distance. The reflecting wall is assumed either to be set in motion at a constant velocity at the instant of reflection or to remain at rest. It is also assumed that the reflecting shock wave is plane and gamma constant throughout the burned gas. A comparison is made between calculation and experiment for normal reflection from a stationary wall of a 2H2 + O2 detonation wave (with gases at the initial pressure of 10 atm.), in a detonation tube 1 in. in diameter and about 10 in. long. (Author)
AD-820 652 HC$3.00 MF$0.65

MECHANISM OF ARMOR PENETRATION,
Watertown Arsenal, Mass.
C. Zener, and R. E. Peterson. 31 May 43, 74p Rept. nos. 2, WAL-710/492

Descriptors: (*Armor piercing ammunition, Armor plate), (*Projectiles, Penetration), Armor, Friction, Mechanics, Force (Mechanics), Angle of attack.

Friction has been found to have a negligible effect during armor penetration. The shearing stresses associated with friction may be calculated quite accurately. It has been found that these are less than 5,000 psi except during the first instant of contact. An estimate has been made of the forces which arise from the inertial resistance of the plate material. These forces are proportional to the square of the projectile velocity, and are greater the blunter ogive. These inertial forces may prevent projectiles from penetrating plate in a velocity range above the ballistic limit. (Author)
ATI-38 750 HC$3.00

HYPERVELOCITY IMPACT DAMAGE IN ALUMINUM TARGETS FINAL REPORT.
Douglas Aircraft Co., Inc., Santa Monica, Calif. Missile and Space Systems Div.
For primary bibliographic entry see Field 20K.
For abstract, see STAR 06 10.
N68-19768 HC$3.00 MF$0.65

19E. Fire Control and Bombing Systems

ELECTRONIC AUDIO RECOGNITION STUDY.
Quarterly progress rept. no. 3, 1 Jan-31 Mar 63, Cornell Aeronautical Lab., Inc., Buffalo, N. Y.
A. E. Murray. 31 Mar 63, 22p CAL-UB-1721-X-3
Contract DA-36-039-sc-90770

Descriptors: (*Target recognition, Military personnel), (*Electronic equipment, Pattern recognition), Doppler radar, Doppler systems, Audiofrequency, Moving target indicators, Vehicles, Feasibility studies, Detection, Target acquisition, Spectrum analyzers, Single sideband communication systems.

In the early part of this third quarter, considerable experimental data has been obtained on the frequency modulation portion of the target recognition device. Later in the quarter, effort was concentrated on the computer analysis. The spectrum analyzing apparatus and computer programs have been completed and tested, including a capability for pictorial spectrogram print-out. Over 60 additional 10-second doppler audio samples have been selected from tape recorded boxcar signals and have been isolated and spaced on a master tape for digitizing and analysis. Added to those already on hand, the total will be equivalent to over 800 one-second test samples in both digital and analog form. Reduced sampling rates for digital spectrum analysis have proved acceptable and reduced analysis time (cost) by a factor of four. Production runs and useful additions to the existing analysis programs are proceeding. (Author)
AD-414 837 HC$3.00

A STUDY IN ACOUSTIC DIRECTION FINDING,
Atmospheric Sciences Lab White Sands Missile Range N Mex
For primary bibliographic entry see Field 17A.
AD-667 916 HC$3.00 MF$0.65

INTERCEPTION RADAR,
Foreign Technology Div Wright-Patterson AFB Ohio
Chang Hung. 30 Jun 67, 9p Rept no. FTD-HT-67-167
Edited trans. of Hang K'ung Chih Shih (Chinese People's Republic), v3 n2 p14-5 1966.

Descriptors: (*Jet fighters, *Aircraft fire control systems), Radar equipment, Airborne, All-weather aviation, China, Fire control system components, Reliability, Accuracy.
Identifiers: Translations.

The article discusses the function, features, and future development of airborne fire control radar. The fire control radar is an essential system which makes an intercepter formidable under all weather conditions. Features of an airborne fire control radar include compactness, easy installation, automatic operation, accuracy, and reliability. Trends in fire control radar development are toward multiple weapon control, increase of firing range, use in combination with other systems, miniaturization, and expanded scope of application.
AD-668 068 HC$3.00 MF$0.65

19F. Guns

DEVELOPMENT OF ELEVATION SERVOMECHANISM, T1.
Pittsburgh Univ., Pa.
For primary bibliographic entry see Field 19C.
AD-452 148 HC$3.00

REALISTIC TARGETS FOR THE TRAINING AND TESTING OF COMBAT RIFLEMEN.
George Washington, Univ., Alexandria, Va. Human Resources Research Office.
For primary bibliographic entry see Field 5I.
AD-489 296 HC$3.00 MF$0.65

THE INFLUENCE OF BREECH ORIENTATION OF THE XM150E4 GUN ON THE LOADER'S TASK AS RELATED TO THE M60A1E1 TANK.
Technical note,
Human Engineering Labs Aberdeen Proving Ground Md
Nonnie F. Dickinson, Jr., George P. Ganem, and James P. Torre, Jr. Dec 66, 27p Rept no. HEL-TN-10-66

Descriptors: (*Tanks (Combat vehicles), *Breech mechanisms), (*Loading (Ordnance projectors), *Human engineering), Obturation (Ballistics), Gas seals, Projectiles, Army personnel, Simulation, Statistical tests, Analysis of variance, Weight, Safety.
Identifiers: M-150 guns, XM-150E4 guns, M-60 tanks, M-60A1E1 tanks, M-409 cartridges (152mm), XM-409 cartridges (152mm), Obturator seals.

The subjects in this study loaded four types of projectiles under two breech orientations and three quadrant-elevation conditions. (Author)
AD-668 229 HC$3.00 MF$0.65

19G. Rockets

THE DIURNAL TIDE NEAR THE STRATOPAUSE OVER WHITE SANDS MISSILE RANGE, NEW MEXICO,
Atmospheric Sciences Lab White Sands Missile Range N Mex
For primary bibliographic entry see Field 4B.
AD-667 909 HC$3.00 MF$0.65

PRELIMINARY STUDY OF THE WIND FREQUENCY RESPONSE OF THE HONEST JOHN M50 TACTICAL ROCKET,

Atmospheric Sciences Lab White Sands Missile Range N Mex
Larry E. Traylor. Mar 68, 21p
ECOM-5183

Descriptors: (*Artillery rockets, Impact prediction), Guided missile ranges, Exterior ballistics, Surface-to-surface, Meteorological parameters, Frequency, Meteorological balloons, Response, Power spectra, Phototheodolites, Atmospheric sounding, Tables, Anemometers, Accuracy, Wind, Upper atmosphere.
Identifiers: Honest John, MGR-1B Missiles, Ballistic meteorology.

A study of the effect of various space frequencies of wind on the impact point of the Honest John M50 unguided tactical rocket is presented. The wind profiles were obtained from Fourier series fits to profiles obtained from Jimsphere balloons. High frequencies were truncated in successive steps to arrive at the effect of such frequencies on the impact point of the Honest John, as computed with a five-degree-of-freedom ballistic simulation model. Significant degradation of accuracy can occur when frequencies down to .001 cycle/ft are truncated. (Author)
AD-667 910 HC$3.00 MF$0.65

A COMPUTER STUDY OF THE WIND FREQUENCY RESPONSE OF UNGUIDED ROCKETS,
Atmospheric Sciences Lab White Sands Missile Range N Mex
For primary bibliographic entry see Field 4B.
AD-667 922 HC$3.00 MF$0.65

UNGUIDED ROCKET BALLISTICS METEOROLOGY CONFERENCE, 31 October-2 NOVEMBER 1967. ADDENDUM,
Atmospheric Sciences Lab White Sands Missile Range N Mex
For primary bibliographic entry see Field 4B.
AD-667 928 HC$3.00 MF$0.65

20. PHYSICS

20A. Acoustics

ON THE INTERNAL FIELD OF AN IRRADIATED, LOW, SOUND-VELOCITY SPHERE OR CYLINDER.
Technical memo.,
Naval Underwater Ordnance Station, Newport, R. I.
G. A. Brigham. Aug 64, 62p NUOS-TM-323

Descriptors: (*Acoustic equipment, Lenses), Acoustics, Wave transmission, Focusing, Spheres, Boundary value problems, Liquids, Transducers, Naval research.
Identifiers: Acoustic lenses.

The mathematical problems of focusing by small liquid or solid, low velocity structures are considered. These problems include aberration, reverberation, focusing of a pulse, side-lobe discrimination, focusing of noise, resonance in the lens, and distortion of beam patterns by using large transducers. (Author)
AD-445 713 HC$3.00

A STUDY OF ACOUSTIC MONITORING OF THE GUN PROBE SYSTEM,
Atmospheric Sciences Lab White Sands Missile Range N Mex
For primary bibliographic entry see Field 4B.
AD-667 917 HC$3.00 MF$0.65

EFFECTS OF ULTRASONIC VIBRATIONS ON TRANSISTORS IN SUBASSEMBLIES.
Army Electronics Command Fort Monmouth N J
For primary bibliographic entry see Field 9E.
AD-667 973 Not available from CFSTI.

THEORETICAL CALCULATION OF CERTAIN QUANTITIES, INFLUENCING THE TRANSMISSION OF SPATIAL CHARACTERISTICS OF THE APPARENT SOURCE OF SOUND,
Foreign Technology Div Wright-Patterson AFB Ohio
V. S. Mankovskii. 25 Jul 67, 24p Rept no. FTD-MT-67-73
Edited machine trans. of Leningradskii Institut Kinoinzhenerov. Trudy (USSR) n10 p75-88 1964.

Descriptors: (*Sound reproduction systems, Sound transmission), Acoustic equipment, Sound signals, Acoustic impedance, Reverberation, Reflection, Audiofrequency, Microphones, Configuration, Mathematical analysis.
Identifiers: Stereophonic transmission.

The method considered permits determining, as the direct and reflected energy are changed, the acoustic ratio and time shifts between signals for each microphone and the whole stereophonic system, depending upon the position of the sources and receivers relative to one another and relative to the reflecting surfaces of the primary location and also depending upon the acoustic properties of the room. These dependences determine the perception of the spatial sound pattern during stereophonic transmissions. (Author)
AD-668 061 HC$3.00 MF$0.65

THE VIDEO TAPE RECORDINGS OF ULTRASONIC TEST INFORMATION,
Naval Ordnance Lab White Oak Md
For primary bibliographic entry see Field 14C.
AD-668 165 HC$3.00 MF$0.65

INVESTIGATION OF THE WAKE BEHIND A CYLINDER AT COINCIDENCE OF A NATURAL FREQUENCY OF VIBRATION OF THE CYLINDER AND THE VORTEX SHEDDING FREQUENCY.
Massachusetts Inst of Tech Cambridge Engineering Projects Lab
For primary bibliographic entry see Field 20D.
AD-668 170 HC$3.00 MF$0.65

UNITED STATES NAVAL OCEANOGRAPHIC OFFICE MARINE GEOPHYSICAL SURVEY PROGRAM 1965-1967 NORTH ATLANTIC OCEAN, NORWEGIAN SEA, AND MEDITERRANEAN SEA, AREA 2, VOLUME 6, OCEANOGRAPHIC STATIONS AND VELOCITY PROFILES.
Texas Instruments Inc Dallas Science Services Div
For primary bibliographic entry see Field 8J.
AD-668 178 HC$3.00 MF$0.65

CITY NOISE AND ITS EFFECT UPON AIRBORNE ANTENNA NOISE TEMPERATURES AT UHF.
Journal article,
Massachusetts Inst of Tech Lexington Lincoln Lab
George Ploussios. 15 May 67, 12p Rept no. JA-3006
ESD-TR-68-35
Contract AF 19 (628)-5167
Availability: Published in IEEE Transactions on Aerospace and Electronic Systems, v4 n1 p41-51 January 1968.

Descriptors: (*Noise, *Urban areas), (*Antenna arrays, Noise), Airborne, Ultrahigh frequency, Temperature, Geometry, Mathematical analysis, Radiometers, Spectrum signatures, Power spectra, Density, Industries, Distribution.

Results of an experimental program to determine the characteristics of city noise and its effect on airborne UHF antennas are presented. Coherent sources of energy from communications equipment, radar, navigational aids, etc. are not included in the analysis. Based upon the experimental data, a model of the industrial noise is presented in which an industrial area is considered as a uniformly distributed source of independent radiators. The magnitude of the power density distribution was computed to be 3x10 to the minus 18th power to 1x10 to the minus 18th power W/sq m/Hz over the UHF band for all the East Coast cities measured, with the exception of New York City which was 5 to 6 dB higher. Relations have been derived and curves plotted to compute antenna noise temperature increase due to city noise, based upon the metropolitan area and its range from the aircraft. (Author)
AD-668 192 Not available from CFSTI.

A DIGITAL COMPUTER FOR THE ELECTRONIC MUSIC STUDIO,
Illinois Univ Urbana Biological Computer Lab
For primary bibliographic entry see Field 9B.
AD-668 308 Not available from CFSTI.

ANALYSIS OF MUSICAL INSTRUMENT TONES,
Illinois Univ Urbana
For primary bibliographic entry see Field 9B.
AD-668 309 Not available from CFSTI.

JET NOISE AND SHEAR FLOW INSTABILITY SEEN FROM AN EXPERIMENTER'S VIEWPOINT.
Massachusetts Inst. of Tech., Cambridge.
E. Mollo-christensen. 1967, 44p NASA-CR-93838
Grants NSG-31-60, NSG-496

Descriptors: *Jet aircraft noise, *Noise spectra, *Phase coherence, *Similarity theorem, *Turbulent flow, Emission spectra, Line spectra, Noise reduction, Nonlinearity, Pressure distribution, Turbulence.

For abstract, see STAR 06 10.
N68-20094 HC$3.00 MF$0.65

ANNUAL REPORT FOR THE YEAR ENDING JUNE 1967.
Southampton Univ. (England). Inst. of Sound and Vibration Research.
Jun 67, 155p

Descriptors: *Acoustics, *Aerodynamic noise, *Audiology, *Research facilities, *Structural vibration, Industrial plants, Measuring instruments, Noise (sound), Project management.

For abstract, see STAR 06 10.
N68-20242 HC$3.00 MF$0.65

PHYSICAL CHARACTERISTICS OF THE SONIC BANGS AND OTHER EVENTS AT EXERCISE WESTMINSTER.
Aeronautical Research Council (Gt. Brit.)
C. H. Warren, and D. R. Webb. 1967, 43p ARC-R+M-3475, RAE-TR-65248
43 P Refs

Descriptors: *Explosions, *Jet aircraft noise, *Sonic booms, Acoustic measurements, Bow waves, Overpressure, Reflected waves, Shock wave propagation, Sound pressure, Sound waves, Wave fronts.

For abstract, see STAR 06 10.
N68-20365 HC$3.00 MF$0.65

ECHO SOUNDING,
National Science Foundation, Washington, D. C. Special Foreign Currency Science Information Program.
For primary bibliographic entry see Field 17A.
TT-67-56062 HC$3.00

20B. Crystallography

LAVES STRUCTURES MgCu2,MgZn2,MgNi2.
Revised ed.,
National Research Council of Canada Ottawa (Ontario) Div of Pure Physics
W. B. Pearson. 31 Jul 67. 3p
Revision of report dated 13 Jun 67.
Availability: Published in Acta Crystallographica, vB24 pt-1 p7-9 Jan 1968.

Descriptors: (*Intermetallic compounds, Crystal structure), (*Magnesium alloys, Crystal structure), Copper alloys, Zinc alloys, Nickel alloys, Crystal lattices, Phase studies, Canada.
Identifiers: Magnesium cuprides, Magnesium nickelides, Magnesium zincides.

It is in some measure demonstrated that the formation of A-B and B-B contacts provides the energy for the compression of the A atoms and permits AB2 phases with radius ratios so much larger (up to 1.67) than the ideal (1.225) to adopt the MgCu2 type structure. At radius ratios somewhat lower than the ideal, the B atoms are insufficiently compressed for A-B and A-A contacts to form. This is probably a consequence of there being twice as many B atoms as A atoms, and it results in fewer known Laves phases with radius ratios below the ideal value than above it. (Author)
AD-668 041 Not available from CFSTI.

HYDROGEN DOPING AND PARAMAGNETIC PROPERTIES OF IONIC CRYSTALS AT HIGH TEMPERATURES,
Rome Air Development Center Griffiss AFB N Y
For primary bibliographic entry see Field 20L.
AD-668 122 HC$3.00 MF$0.65

INVESTIGATION OF THE ENERGY SPECTRA OF ATOMS SPUTTERED FROM A TUNGSTEN SINGLE CRYSTAL BY MERCURY IONS,
Foreign Technology Div Wright-Patterson AFB Ohio
M. B. Benyaminovich, and R. A. Ashmyanskii.
30 Aug 67, 12p Rept no. FTD-HT-67-193
Edited trans. of Akademiya Nauk Uzbekskoi SSR, Tashkent. Izvestiya. Seriya Fiziko-Matematicheskikh Nauk, n2 p58-62 1966.

Descriptors: (*Tungsten, Sputtering), (*Sputtering, *Single crystals), Ion bombardment, Ion beams, Mercury, Symmetry (Crystallography), Energy, Distribution, USSR.
Identifiers: Translations.

In order to clarify the cathode sputtering mechanism, the sputtering of single crystals was studied with particular attention given to a comparison of conditions required for yielding sputtered particles in various crystallographic directions.
AD-668 157 HC$3.00 MF$0.65

DAMPING IN DEFORMED IRON CONTAINING INTERSTITIAL IMPURITIES.
Columbia Univ New York Henry Krumb School of Mines
For primary bibliographic entry see Field 11F.
AD-668 173 HC$3.00 MF$0.65

THE INTERACTION OF INTERSTITIAL IMPURITIES WITH DISLOCATIONS IN IRON,
Columbia Univ New York Henry Krumb School of Mines
For primary bibliographic entry see Field 11F.
AD-668 286 Not available from CFSTI.

SEARCH FOR SURFACE MODES OF LATTICE VIBRATIONS IN MAGNESIUM OXIDE,
Oesterreichische Studiengesellschaft Fuer Atomenergie G M B H Seibersdorf Physics Inst
For primary bibliographic entry see Field 20L.
AD-668 355 Not available from CFSTI.

LEED STUDY OF THE GROWTH OF ALUMINUM FILMS ON THE Ta (110) SURFACE.
Interim rept.,
Systems Research Labs Inc Dayton Ohio
Allen G. Jackson, Michael P. Hooker, and Trice W. Haas. Feb 68, 11p
ARL-68-0042
Contract F33615-67-C-1041
Availability: Published in Journal of Applied Physics, v38 n13 p4998-5004 Dec 67.

Descriptors: (*Epitaxial growth, Aluminum), (*Aluminum, Films), Tantalum, Electron diffraction analysis, Vapor plating, Vacuum apparatus, Crystal structure, Interfaces, Surface properties, Phase studies.
Identifiers: LEED (Low energy electron diffraction), Order-disorder theory, *Thin films.

Growth of aluminum films on clean Ta (110) surfaces has been investigated by LEED techniques. Five phases of aluminum have been found, which are: (1) disordered Al (111), formed by depositing at T<600 degrees C; (2) Al (111)-c (2X2) formed by heating film, deposited at T<300 degrees C, to 700 degrees C; (3) Al (100)-c (2X2), formed by heating film, deposited 300<T<600 degrees C, to 700 degrees C; (4) Epitaxial Al (111), formed by depositing film with substrate T in range 600<T <670 degrees C; (5) Diffuse phase, formed by heating any of the preceding to 800 degrees C. Two orientations of each structure have been observed; this results from the close match between primitive unit meshes of aluminum (111), (100) and Ta (110). A mechanism for the growth of Al (111) and Al (100) is suggested. Comparisons with some published LEED data on epitaxy are made. (Author)
AD-668 375 Not available from CFSTI.

CRYSTALLIZATION DURING POLYMERIZATION.
Rensselaer Polytechnic Inst Troy N Y Dept of Chemistry
For primary bibliographic entry see Field 7D.
AD-668 382 Not available from CFSTI.

EXCIMER EMISSION OF NAPHTHALENE, ANTHRACENE, AND PHENANTHRENE CRYSTALS PRODUCED BY VERY HIGH PRESSURES,
Aerospace Corp El Segundo Calif Lab Operations
For primary bibliographic entry see Field 7E.
AD-668 448 HC$3.00 MF$0.65

ETCHING BEHAVIOR OF In2O3 GROWN FROM PbO-B2O3,
Aerospace Corp El Segundo Calif Lab Operations
Armond B. Chase, and James R. Teviotdale. Mar 68, 18p Rept no. TR-0158 (9230-03)-4
SAMSO-TR-68-165
Contract F04695-67-C-0158

Descriptors: (*Etched crystals, *Indium compounds), Oxides, Single crystals, Etching, Nitric acid, Hydrochloric acid, Crystal growth, Dislocations.
Identifiers: Indium oxide.

Single crystals of In2O3 grown from a PbO-B2O3 solution are etched by HNO3 or HNO3-HCl solutions. Characteristic etch pits and etch tubes are described. The number of etch pits is found to be related to the growth history of the crystals. The relationship of the etch tubes to crystal growth is discussed. (Author)
AD-668 449 HC$3.00 MF$0.65

NOTE ON FATIGUE MECHANISM IN FCC METALS AT ULTRASONIC FREQUENCIES.
Columbia Univ New York Dept of Civil Engineering and Engineering Mechanics
For primary bibliographic entry see Field 11F.
AD-668 499 HC$3.00 MF$0.65

RESEARCH ACTIVITIES IN THE FIELD OF MATERIALS SCIENCE.
North Carolina Univ Chapel Hill Materials Research Center
For primary bibliographic entry see Field 11G.
AD-668 501 HC$3.00 MF$0.65

BASIC LANGUAGE COMPUTER PROGRAM FOR CALCULATING INTERPLANAR SPACINGS,
Union Carbide Corp., Oak Ridge, Tenn. Y-12 Plant.
P. R. Budelov, and J. R. Cullipher. 15 Feb 68, 24p
Contract W-7405-eng-26

Descriptors: (*Crystal structure, Computer programs), Mathematical analysis, Crystal lattices, X-ray diffraction analysis, Classification, X-ray diffraction cameras, Indexes, Computational linguistics.
Identifiers: Interplanar spacings.

For abstract, see NSA 22 08.
Y-1603 HC$3.00 MF$0.65

20C. Electricity and Magnetism

HIGH VOLTAGE BREAKDOWN STUDY.
Quarterly progress rept. no. 12, 16 Aug-15 Nov 67,
Ion Physics Corp Burlington Mass
W. R. Bell, M. J. Mulcahy, and A. Watson. Mar 68, 139p
ECOM-00394-12
Contract DA-28-043-AMC-00394 (E), ARPA Order-517

Descriptors: (*Electron tubes, Failure (Electronics)), Vacuum, Voltage, Magnetic fields, Interactions, Electrodes, Statistical analysis, Diagrams, Electric arcs, Electric discharges, Vacuum apparatus, Light, X rays, Etching.
Identifiers: Graphs (Charts), Breakdown (Electrical).

Statistical and physical analyses of the block of eight experiments were carried out for unconditioned gaps and for conditioned gaps with and without perpendicular magnetic field. The other factors examined were anode and cathode treatment (vacuum or hydrogen firing) and electrode size. Prebreakdown current and breakdown voltage values were examined in the statistical analysis. Second order and higher order interactions were found to be important in addition to main factor effects. The magnetic field significantly affected the breakdown voltage and also interacted with other factors. The theoretical model of the breakdown mechanism developed was consistent with the results and trends of the statistical analysis. The 300 kv apparatus was disassembled for complete overhaul, cleaning and remachining. This included electropolishing of the vacuum chamber and polishing of all gold O-ring surfaces. The box heating oven was replaced with a form fitting as heater blanket unit and the controls for both and the electrode heaters were made completely automatic. The latter have now been removed from the vacuum envelope and the complete system has been reassembled, baked and made vacuum tight. (Author)
AD-667 904 HC$3.00 MF$0.65

AZIMUTHALLY DEPENDENT MODES ON UNIFORM SOLID ELECTRON BEAMS.
Technical rept.,
Army Electronics Command Fort Monmouth N J
Bruno Zotter. Dec 67, 36p Rept no. ECOM-2928

Descriptors: (*Electron beams, Propagation), Cyclotron waves, Space charges, Plasma oscillations,

Equations of motion, Dispersion relations, Interactions, Magnetic fields, Graphics.
Identifiers: Slow waves.

The dispersion relation in the slow wave approximation for a finite electron beam in a finite magnetic field is solved for the azimuthal mode numbers m = plus or minus 1. The modes are grouped into space-charge, cyclotron and synchronous waves according to their characteristics. Normalized radial propagation constants and plasma frequency reduction factors are plotted versus the normalized longitudinal propagation constant with the ratio of plasma to vortex frequency as parameter. These plots are frequency independent and allow construction of the omega-beta diagram by a simple graphical method. Numerical results are presented for a beam-to-tunnel diameter ratio of 0.8. (Author)
AD-667 905 HC$3.00 MF$0.65

INSTABILITY OF DISCHARGE WITH AN INCANDESCENT CATHODE IN A MAGNETIC FIELD AT LOW PRESSURES,
Foreign Technology Div Wright-Patterson AFB Ohio
For primary bibliographic entry see Field 20H.
AD-668 028 HC$3.00 MF$0.65

MICROWAVE SURFACE RESISTANCE OF SUPERCONDUCTING NIOBIUM,
Stanford Univ Calif High Energy Physics Lab
John P. Turneaure, and Ira Weissman. Mar 68, 44p Rept no. HEPL-552
Contract Nonr-225 (67)
Prepared in cooperation with Varian Associates, Palo Alto, California. Central Research Labs.
Availability: To be published in Journal of Applied Physics.

Descriptors: (*Superconductors, Surface properties), (*Resistance (Electrical), Superconductors), Cryogenics, Niobium, Microwave frequency, Transition temperature, Magnetic fields, Electric fields, Band theory of solids, Specific heat.

The unloaded Q's of pure Nb cavities in the TE sub 011 mode at 11.2 GHz and in the TM sub 010 mode at 8.4 GHz were measured between 1.2 and 4.2 degrees K to determine whether the residual surface losses in Nb could be made sufficiently low to make it a useful material for practical microwave devices. In the TE sub 011 mode, a residual Q of 3.8 x 10 to the 10th power was achieved. Also in the TE sub 011 mode, the unloaded Q was observed to be essentially a constant up to the ac critical magnetic field H prime where it abruptly decreased by a factor of 100 or more. An H prime as large as 436 Oe was observed for unstrained Nb. In the TM sub 010 mode which has electric fields terminating on the surface of the Nb, a residual Q of 2 x 10 to the 9th power was achieved, the limitation on the maximum field level in the cavity was H prime, and no power loss associated with electric-field emission was observed up to an electric field of 210,000 V/cm which was the maximum field level obtained in the cavity. The Mattis and Bardeen theoretical expression for the superconducting surface resistance fits the data very well, and the value of the energy gap obtained from the fitting procedure agrees with values obtained by other methods.
AD-668 034 Not available from CFSTI.

SUPERCONDUCTORS IN PHYSICS AND TECHNOLOGY,
Foreign Technology Div Wright-Patterson AFB Ohio
V. P. Kartsev. 18 Aug 67, 81p Rept no. FTD-MT-24-109-67
Edited machine trans. of Novoe v Zhizni, Nauke, Tekhnike, Seriya 9: Fizika Matematika Astronomiya (USSR) n8 p1-48 1965.

Descriptors: (*Superconductors, USSR), Magnets, Superconductivity, Magnetic tape, Spacecraft, Computers, Power equipment, Low-temperature research, History, Power transformers, Resistance (Electrical), Direct current, Circuits, Electromagnetism.
Identifiers: Translations.

The popularized booklet discusses the history of low temperature physics; properties of superconductors; the nature of the phenomena occurring at low temperatures; superconducting magnets; and the use of superconductors in power generation, computers and space ships. (Author)
AD-668 048 HC$3.00 MF$0.65

ELECTRIC FIELD IN THE IONOSPHERE: A THEORY OF ITS ORIGIN AND EFFECT.
Air Force Cambridge Research Labs L G Hanscom Field Mass
For primary bibliographic entry see Field 4A.
AD-668 092 HC$3.00 MF$0.65

THERMAL EMF OF THE SOLID SOLUTIONS OF INDIUM PHOSPHIDE AND GALLIUM ARSENIDE,
Foreign Technology Div Wright-Patterson AFB Ohio
N. N. Sirota, and L. A. Makovetskaya. 29 Aug 67, 9p Rept no. FTD-HT-66-771
Unedited rough draft trans. of Akademiya Nauk BSSR, Minsk. Doklady, v9 n7 p435-7 1965, tr. by E. Harter.

Descriptors: (*Seebeck effect, Solid solutions), Temperature, Gallium arsenides, Indium compounds, Phosphides, Impurities, Electrical properties, USSR.
Identifiers: Translations, Indium phosphide.

The dependence of the thermal emf on the composition and temperature has been investigated in InP, GaAs, and 9 InP-GaAs alloys with a composition varying from 0.1 InP-0.9 GaAs to 0.9 InP-0.1 GaAs, and an impurity concentration within limits of 1.7x10 to the 16th power to 3.0x10 to the 19th power. The thermal emf was measured on polycrystalline n- and p-specimens in a vacuum or a helium atmosphere in the 120 - 600 degrees K range; the temperature difference at the hot and cold ends of the specimens was 10 - 12 degrees C. The differential thermal emf readings were practically identical during heating or cooling and increased with increasing temperature after passing through a small minimum below room temperature. At all test temperatures, the maximum value of alpha squared sigma (where sigma is the specific electric conductivity) was observed in an alloy containing 30% GaAs; with increasing temperature, the value of alpha squared sigma increased.
AD-668 114 HC$3.00 MF$0.65

MAGNETIC INTERACTIONS AND SPIRAL GROUND STATES IN SPINELS, WITH APPLICATION TO ZnCr2Se4.
Journal article,
Massachusetts Inst of Tech Lexington Lincoln Lab
K. Dwight, and N. Menyuk. Nov 67, 8p Rept no. JA-3066
ESD-TR-68-4
Contract AF 19 (628)-5167
Availability: Published in The Physical Review, v163 n2 p435-43 Nov 10 1967.

Descriptors: (*Spinels, Magnetic properties), (*Antiferromagnetism, Spinels), Zinc compounds, Chromium compounds, Selenides, Magnetic moments, Interactions, Ground state, Crystal structure, Ferromagnetism, Chemical bonds.
Identifiers: *Zinc seleniochromite, Superexchange interactions.

It is found that five distinct distant-neighbor interactions must be considered in order to characterize adequately the Heisenberg energy in normal cubic spinels having diamagnetic A-site ions. The classical theory of the ground spin state is presented in terms of these interactions, which span a five-dimensional parameter space. It is demonstrated that the ground state consists of a spiral spin configuration with k = (0,0,l) if and only if the parameter values fall inside a limited region, which is determined rigourously by means of the Luttinger-Tisza method. Because of the circumscription of this spiral ground-state region, agreement with the experimental findings for ZnCr2Se4 requires that at least one of the distant-neighbor interactions be ferromagnetic. Furthermore, these interactions can be analyzed into their constituent superexchange terms, which can in turn be related by standard superexchange theory. The resulting criteria for physical reasonability place additional limits upon the acceptable range of values for the interactions. This range is found to exclude those sets of interactions which have previously been proposed in the literature. A simplified superexchange model is used to illustrate the determination of physically reasonable fits to the data and to study their dependence upon the degree of A-site covalence. (Author)
AD-668 194 Not available from CFSTI.

RESEARCH IN MATERIALS SCIENCE AND ENGINEERING.
Massachusetts Inst of Tech Cambridge
For primary bibliographic entry see Field 11G.
AD-668 215 HC$3.00 MF$0.65

DIELECTRIC LOSS IN CaF2 DOPED WITH OXYGEN IONS.
Utah Univ Salt Lake City Inst of Materials Research
For primary bibliographic entry see Field 7D.
AD-668 275 Not available from CFSTI.

ELECTRICAL RESISTIVITY OF NiAl, CoAl, NiGa, AND CoGa,
Northwestern Univ Evanston Ill Dept of Materials Science
For primary bibliographic entry see Field 20L.
AD-668 318 Not available from CFSTI.

MAGNETIC TORSION MEASUREMENTS ON HEXAGONAL FeGe,
Uppsala Univ (Sweden) Inst of Physics
K. A. Blom, O. Beckman, and M. Richardson. 1967, 4p
AFOSR-68-0881
Contract AF 61 (052)-937
Availability: Published in Solid State Communications, v5 p977-9 1967.

Descriptors: (*Intermetallic compounds, Magnetic properties), Single crystals, Crystal growth, Crystal structure, Magnetic moments, Interactions, Germanium alloys, Iron alloys, Anisotropy, Torque, Sweden.
Identifiers: Hexagonal crystals, Neel temperature, Iron germanide, Magnetic susceptability.

The magnetic anisotropy of single crystal FeGe, with the hexagonal B35 structure, has been studied by magnetic torsion measurements. The Neel temperature is 412 plus or minus 2 degrees K. The results indicate that the spins are parallel to the c-axis, probably with ferromagnetic ordering within each c-plane. (Author)
AD-668 356 Not available from CFSTI.

ANISOTROPY OF THE NIOBIUM ENERGY GAP BY A SINGLE CRYSTAL TUNNELING TECHNIQUE.
Massachusetts Inst of Tech Cambridge Dept of Metallurgy and Materials Science
For primary bibliographic entry see Field 20L.
AD-668 360 Not available from CFSTI.

INFLUENCE OF A SOLAR ACTIVE REGION ON THE INTERPLANETARY MAGNETIC FIELD.
Technical rept.,
California Univ Berkeley Space Sciences Lab
Kenneth H. Schatten, Norman F. Ness, and John M. Wilcox. 3 Apr 68, 40p Rept no. Series-9-Issue-17
Contract Nonr-3656 (26), Grant NsG-243

Research supported in part by NSF grant GA-1319.
Availability: To be published in Solar Physics.

Descriptors: (*Astrophysics, Magnetic fields), (*Mapping, Scientific satellites), Mathematical prediction, Curved profiles, Terrestrial magnetism, Solar disturbances, Solar wind, Vector analysis, Configuration.
Identifiers: Sectors (Magnetic), Graphs (Charts), Magnetic loops, Interplanetary space, Ecliptic plane, Field lines (Magnetic).

The interplanetary magnetic field has been mapped between 0.4 and 1.2 AU in the ecliptic plane, extrapolating from satellite measurements at 1 AU. The structure within sectors and the evolution of sectors are discussed. The development of a solar active region appears to produce magnetic loops in the interplanetary medium that result in the formation of a new sector. (Author)
AD-668 377 Not available from CFSTI.

FERROMAGNETIC RESONANCE IN A UNIAXIAL ANISOTROPIC FERRITE: BaFe12O19.
Scientific Interim rept.,
Polytechnic Inst of Brooklyn Farmingdale N Y Dept of Electrophysics
L. M. Silber, E. Tsantes, and P. Angelo. 3 Apr 68, 6p
AFOSR-68-0844
Contract AF-49 (638)-1402
Availability: Published in Journal of Applied Physics, v38 n13 p5315-8 Dec 1967.

Descriptors: (*Barium compounds, Ferromagnetism), (*Ferrites, *Magnetic resonance), Single crystals, Magnetic moments, Anisotropy.
Identifiers: Barium ferrite, Magnetic domains.

Ferromagnetic resonance was observed in a single-crystal sample of barium ferrite, BaFe12O19, under both single-domain and multidomain conditions, for orientations of the static field from 0-90 deg, with the easy axis of magnetization. The results verify in detail the predictions of the theory of Smit and Beljers for single-domain conditions, and show qualitative agreement with the multidomain theory. (Author)
AD-668 387 Not available from CFSTI.

A SOLAR MAGNETIC PATTERN EXTENDING FROM 40N TO 35S.
California Univ Berkeley Space Sciences Lab
For primary bibliographic entry see Field 3B.
AD-668 408 Not available from CFSTI.

SIMULTANEOUS PARALLEL PUMPING OF NUCLEAR AND ELECTRONIC SPIN WAVES,
Pittsburgh Univ Pa Dept of Physics
For primary bibliographic entry see Field 20L.
AD-668 422 Not available from CFSTI.

s-d MODEL WITH NONSPHERICAL FERMI SURFACE,
Pittsburgh Univ Pa Dept of Physics
For primary bibliographic entry see Field 20L.
AD-668 424 Not available from CFSTI.

THEORY OF FERRIMAGNETISM IN INSULATORS.
Final rept.,
Battelle Memorial Inst Columbus Ohio Columbus Labs
Richard P. Kenan. 6 Mar 68, 6p
AFOSR-68-0855
Grant AF-AFOSR-868-65

Descriptors: (*Magnetic moments, Interactions), (*Ferrites, Thermodynamics), Transition temperature, Magnetite, Crystal lattices, Specific heat, Anomalies, Antiferromagnetism.
Identifiers: Ferrimagnetism, Spin waves, Curie temperature, Heat capacity.

The purposes of this investigation have been to develop, with as much rigor as possible, improved spin-wave theories, to use the theories developed to obtain interpretive formulas for the transition temperature, dispersion curves, and the thermodynamic properties of magnetic insulators, and, somewhat more specialized, to explain the anomalous magnitude of the low-temperature heat capacity of a large number of ferrites, typified by magnetite. There have been three principal accomplishments: (1) A theory of spin-waves in ferrites of arbitrary structure and general exchange constants has been derived; (2) A theory of the effect of statistical interference among spin-waves, resulting from the operation of the Pauli principle, has been developed for a system of spins of magnitude one-half with antiferromagnetic exchange; and (3) A theory of the possible influence of magnetostatic modes of oscillation of the spin system on the heat capacity of ferrites was derived. In addition to these results, research has been carried out and is continuing on the application of functional techniques to the derivation of more reliable spin-wave theories, and on the application of the theory (1), above, to the metamagnetic transition metal chlorides.
AD-668 458 HC$3.00 MF$0.65

RESEARCH ACTIVITIES IN THE FIELD OF MATERIALS SCIENCE.
North Carolina Univ Chapel Hill Materials Research Center
For primary bibliographic entry see Field 11G.
AD-668 501 HC$3.00 MF$0.65

ACOUSTOELECTRIC EFFECTS IN SOLIDS.
Norwegian Defence Research Establishment Kjeller
For primary bibliographic entry see Field 20L.
AD-668 503 HC$3.00 MF$0.65

SURFACE IONIZATION OF IODINE AND SODIUM ON AN INCANDESCENT POLYCRYSTALLINE TANTALIC THREAD,
Foreign Technology Div Wright-Patterson AFB Ohio
For primary bibliographic entry see Field 7D.
AD-668 504 HC$3.00 MF$0.65

EXPERIMENTAL STUDY OF A TRANSPIRATION-COOLED, CONSTRICTED ARC.
Minnesota Univ Minneapolis Heat Transfer Lab
For primary bibliographic entry see Field 20I.
AD-668 510 HC$3.00 MF$0.65

20D. Fluid Mechanics

A GENERAL METHOD FOR DETERMINING THE AERODYNAMIC CHARACTERISTICS OF FAN-IN-WING CONFIGURATIONS. VOLUME I. THEORY AND APPLICATION.
Boeing Co Renton Wash Commercial Airplane Div
For primary bibliographic entry see Field 1C.
AD-667 980 HC$3.00 MF$0.65

THE STABILITY OF A WEDGE-SHAPED AIRFOIL IN A SUPERSONIC FLOW.
Johns Hopkins Univ Silver Spring Md Applied Physics Lab
For primary bibliographic entry see Field 1C.
AD-667 998 HC$3.00 MF$0.65

INVESTIGATION OF A VORTEX WAKE BEHIND A BODY OF REVOLUTION,
Johns Hopkins Univ Silver Spring Md Applied Physics Lab
E. K. Buchinskaya, and K. A. Pochkina. 28 Feb 68, 27p Rept no. APL-TG-230-T546
Contract NOw-62-0604
Trans. of Promyshlennaya Aerodinamika (USSR) n27 p121-44 1966, tr. by A. I. /Schidlovsky.

Descriptors: (*Bodies of revolution, *Wake), Vortices, Turbulence, Angle of attack, Reynolds number, Jets, Wind tunnel models, Model tests, Downwash, Trailing edge, Pressure, Velocity, USSR.
Identifiers: Translations.

Results are given of an experimental study of the structure of a vortex wake behind a thin body of revolution at different angles of attack. Wake measurements were carried out in a closed wind tunnel at a flow velocity corresponding to a Reynolds number of 4,300,000 and angles of attack of 0, 10, 20 and 30 degrees. The total, dynamic and static pressures were measured in various sections behind the body. The dimensionless velocity and coefficients of static and total pressure were calculated from these measurements. (Author)
AD-667 999 HC$3.00 MF$0.65

OSCILLATIONS OF AN ELASTIC PLATE IN A FLUID,
Foreign Technology Div Wright-Patterson AFB Ohio
A. S. Povitskii. 29 Aug 67, 12p Rept no. FTD-HT-66-790
Unedited rough draft trans. of Izvestiya Vysshikh Uchebnykh Zavedenii. Aviatsionnaya Tekhnika (USSR) n4 p30-5 1958, tr. by E. Harter.

Descriptors: (*Hydrodynamic configurations, Oscillation), Elasticity, Fluids, Resonant frequency, Equations of motion, Thickness, Modulus of elasticity, USSR.
Identifiers: Plates (Mechanical), Translations.

The two-dimensional problem of an oscillating elastic plate is discussed, the plate being either of a constant or of a variable thickness and in contact with the free surface of the ideal liquid (the case of a submerged plate may be obtained from the above by a duplication of the corresponding coefficient). Only free natural frequencies are considered, and especially the first mode of oscillation. (Author)
AD-668 018 HC$3.00 MF$0.65

ON THE APPLICATION OF THE 'LAW OF PLANE SECTIONS' TO THE DETERMINATION OF THE AERODYNAMIC FORCES ACTING ON OSCILLATING SHELLS,
Foreign Technology Div Wright-Patterson AFB Ohio
V. V. Bolotin. 29 Aug 67, 13p Rept no. FTD-HT-66-763
Unedited rough draft trans. of Akademiya Nauk SSSR. Izvestiya. Mekhanika i Mashinostroenie, n1 p159-62 1961, tr. by E. Harter.

Descriptors: (*Structural shells, *Aeroelasticity), Flutter, Oscillation, Cylindrical bodies, Compressible flow, Potential theory, Equations of motion; Bending, USSR.
Identifiers: Translations.

Consideration is given to the oscillations of an infinitely long circular cylindrical shell which is elastic, around which occurs the potential flow of a compressible gas in the direction of the generators. It is shown that the approximate solution can be obtained from the exact one by a limiting process and so the approximate solution has an asymptotic character. In addition to the conditions for the limiting process, it is required that the condition of quasi-stationarity and a condition on the disturbances must be fulfilled. The bending of the shell and the aerodynamic disturbances are assumed small enough for linearized theory to apply. The equations to be solved are the equations of motion of the shell and the equation for the disturbance velocity potential. For an infinitely long cylinder, the exact solution is known. (Author)
AD-668 031 HC$3.00 MF$0.65

ON THE CALCULATION OF UNSTEADY NONLINEAR THREE-DIMENSIONAL SUPERSONIC FLOW PAST WINGS,
Stanford Univ Calif Dept of Aeronautics and Astronautics
For primary bibliographic entry see Field 1C.
AD-668 069 HC$3.00 MF$0.65

AEROELASTIC STABILITY CHARACTERISTICS OF CYLINDRICAL SHELLS CONSIDERING IMPERFECTIONS AND EDGE CONSTRAINT,
Texas Univ Austin Dept of Aerospace Engineering
For primary bibliographic entry see Field 1C.
AD-668 074 HC$3.00 MF$0.65

ENTROPY OF TURBULENT GAS: MACROSCOPIC AND TURBULENT PARTS. BOUNDARY-LAYER: EXPRESSIONS FOR CELERITIES OF FILTERED FLUCTUATIONS; FIRST MEASUREMENTS FOR TEMPERATURE FLUCTUATIONS.
Final scientific rept. no. 4,
Aix-Marseille Univ (France) Institut de Mecanique Statistique de La Turbulence
Alexandre Favre, Regis Dumas, and Edmond Verollet. Jan 68, 51p
AFOSR-68-0798
Contract F61052-67-C-0025

Descriptors: (*Flow separation, Turbulence), Boundary layer, Gas flow, Measurement, Heat transfer, Analysis of variance, Equations of state, Band-pass filters, France, Entropy, Thermodynamics.

(1) A discussion is given of separation of entropy for turbulent gas into macroscopic and fluctuating parts. When the macroscopic part has by definition the evolution property it has not exactly the GIBB's form, and recriprocally. The defect terms are expressed in both cases, for evaluation in each field of applications. (2) The equations for filtered space-time velocity correlations in turbulent flow are given in terms of celerities. The case of a narrow band-pass filter is discussed. Measurements of the celerities for velocity and temperature space-time correlation are made, in a boundary layer of a heated plate. They are both larger than the mean velocity of fluid in the inner part of the boundary layer. (Author)
AD-668 083 HC$3.00 MF$0.65

HEAT EXCHANGE OF BODIES OF DIFFERENT FORM WITH TURBULENT FLOW OF AIR,
Foreign Technology Div Wright-Patterson AFB Ohio
For primary bibliographic entry see Field 20M.
AD-668 096 HC$3.00 MF$0.65

SUPERSONIC FLOW PAST BODIES OF ROTATION WITH ANNULAR GAP,
Foreign Technology Div Wright-Patterson AFB Ohio
For primary bibliographic entry see Field 1C.
AD-668 103 HC$3.00 MF$0.65

INTERFERENCE MEASUREMENTS MASS TRANSFER IN A TURBULENT BOUNDARY LAYER OF A PERMEABLE SURFACE,
Foreign Technology Div Wright-Patterson AFB Ohio
L. A. Fayngold. 28 Jul 67, 14p Rept no. FTD-MT-24-105-67
Edited machine trans. of mono. Teplo- i Massoobmen Tel s Okruzhayushchei Gazovoi Sredoi, Minsk, 1965 p123-9.

Descriptors: (*Turbulent boundary layer, Flow fields), Interferometers, Permeability, Porous materials, Surface properties, Gas flow, Mathematical analysis, USSR, Mass transfer, Carbon dioxide, Impurities.
Identifiers: Seedants, Blowing, Translations.

Tne object of the work was the interferometric measurement of the concentration field of an admixture (carbon dioxide gas) blown into a turbulent boundary layer through a permeable surface under isothermal conditions. The experimental apparatus consisted of an open type aerodynamic tube with a closed working column 0.8 meters long and with a cross section 190 x 360 mm. The porous plate being investigated was placed in the lower wall. The flow velocity through the plate was varied smoothly up to 40 meters/sec. The porous plate was made of stainless steel and had dimensions of 0.28 x 0.35 x 0.005 meters. Photography of the radiation process was done with a 'Zenith-S' camera directly on the apparatus. A formula is derived for the direct calculation of the profiles of the relative carbon dioxide concentrations in the boundary layer with blowing of carbon dioxide gas. (Author)
AD-668 112 HC$3.00 MF$0.65

STABILITY OF A THREE-LAYER ORTHOTROPIC PLATE IN A SUPERSONIC GAS FLOW,
Foreign Technology Div Wright-Patterson AFB Ohio
For primary bibliographic entry see Field 1C.
AD-668 121 HC$3.00 MF$0.65

STATISTICAL ANALYSIS OF TEMPERATURE DATA FROM WIND TUNNEL TEST OF A VON KARMAN RADOME.
Johns Hopkins Univ Silver Spring Md Applied Physics Lab
For primary bibliographic entry see Field 17I.
AD-668 135 HC$3.00 MF$0.65

AIR PROPERTIES AND FLOW CONDITIONS AROUND THE NOSE OF A BLUNT RADOME.
Johns Hopkins Univ Silver Spring Md Applied Physics Lab
For primary bibliographic entry see Field 17I.
AD-668 145 HC$3.00 MF$0.65

CERTAIN PROBLEMS OF GAS DYNAMICS OF STREAMS IN TRANSVERSE FLOW DURING BURNING,
Foreign Technology Div Wright-Patterson AFB Ohio
For primary bibliographic entry see Field 21B.
AD-668 156 HC$3.00 MF$0.65

UNSTABLE CONVECTION HEAT EXCHANGE AND HYDRODYNAMICS IN CHANNELS (SURVEY OF LITERATURE ON SINGLE-PHASE HEAT TRANSFER AGENTS),
Foreign Technology Div Wright-Patterson AFB Ohio
For primary bibliographic entry see Field 20M.
AD-668 159 HC$3.00 MF$0.65

INVESTIGATION OF THE WAKE BEHIND A CYLINDER AT COINCIDENCE OF A NATURAL FREQUENCY OF VIBRATION OF THE CYLINDER AND THE VORTEX SHEDDING FREQUENCY.
Technical rept.,
Massachusetts Inst of Tech Cambridge Engineering Projects Lab
Charles L. Ballou. 19 May 67, 45p Rept no. TR-76028-2
Contract Nonr-3963 (25)

Descriptors: (*Aerodynamic noise, *Vortices), Cylindrical bodies, Resonant frequency, Wake, Vibration, Reynolds number, Correlation techniques, Velocity.
Identifiers: *Vortex shedding, Aeolian tones, Unsteady flow.

Experimental results of the investigation of the wake behind a cylinder shedding vortices at a frequency that was the same as a natural vibrational frequency of the cylinder are presented. The lateral spacial correlation of vortex shedding, the distance behind the cylinder, and the value of RMS velocity at the assumed position where the vortices start to 'roll up' were found not to deviate from the normal trend with respect to Reynolds number when coincidence of the two frequencies occur. (Author)
AD-668 170 HC$3.00 MF$0.65

MOTIONS OF A FLOAT-SUPPORTED AIRCRAFT IN A SEAWAY.
Hydronautics Inc Laurel Md
For primary bibliographic entry see Field 1C.
AD-668 171 HC$3.00 MF$0.65

SOME ASPECTS OF CYLINDRICAL SHELL PANEL FLUTTER.
Revised ed.,
Texas Univ Austin Dept of Aerospace Engineering
L. L. Carter, and R. O. Stearman. 2 Aug 67, 9p
AFOSR-68-0750
Contract AF 49 (638)-1639
Revision of report dated 23 Mar 67. Doctoral thesis. Prepared for presentation at the AIAA Aerospace Sciences Meeting (5th), New York, 23-26 Jan 67. Paper 67-78. Prepared in cooperation with General Electric Co., Philadelphia, Pa., Missile and Space Div.
Availability: Published in AIAA Journal, v6 n1 p37-43 1968.

Descriptors: (*Axially symmetric flow, *Flutter), Structural shells, Panels (Structural), Cylindrical bodies, Aeroelasticity, Supersonic characteristics, Deformation, Aerodynamic loading, Correlation techniques, Equations of motion.

The investigation makes a direct comparison of cylindrical shell panel flutter boundaries obtained analytically with recent experimental boundaries reported in the literature. Further, an attempt is made to explain the discrepancies of the comparison through refinements of some structural aspects of the analysis. The nonlinear Donnell shell theory is utilized together with the first-order, high Mach number approximation to the linear potential flow theory. The axisymmetric preflutter deformation due to internal pressurization and axial loading of the shell in the presence of an airstream is included in the analysis as the configuration about which the shell flutters. The structural boundary conditions assumed for the flutter state are the simply supported, zero-traction boundary conditions as well as the classical, simply supported boundary conditions. The problem associated with the predeformation state of the shell was solved exactly, whereas the approximate technique of B. G. Galerkin was employed to solve the linearized system of flutter equations. In general, it is shown that agreement exists between the theory and experiment only in the region of small amounts of static loading of the shell. (Author)
AD-668 218 Not available from CFSTI.

CALCULATION OF PLANE AND AXIALLY-SYMMETRICAL SUPERSONIC FLOWS IN THE PRESENCE OF IRREVERSIBLE PROCESSES,
Foreign Technology Div Wright-Patterson AFB Ohio
For primary bibliographic entry see Field 1C.
AD-668 232 HC$3.00 MF$0.65

WAVE DAMPING EFFECTS OF SCREENS; HYDRAULIC MODEL INVESTIGATION.
Army Engineer Waterways Experiment Station Vicksburg Miss
For primary bibliographic entry see Field 13K.
AD-668 236 HC$3.00 MF$0.65

THERMO-MOLECULAR PRESSURE EFFECTS IN TUBES AND AT ORIFICES,
Advisory Group for Aerospace Research and Development Paris (France)
For primary bibliographic entry see Field 14B.
AD-668 251 HC$3.00 MF$0.65

A LABORATORY STUDY ON THE DRAG FORCE DISTRIBUTION WITHIN MODEL FOREST CANOPIES IN TURBULENT SHEAR FLOW,
Colorado State Univ Fort Collins Fluid Mechanics Program
G. Hsi, and J. H. Nath. Mar 68, 72p Rept no. CER67-68GH-JHN50
Grant DA-AMC-28-043-65-G20

Descriptors: (*Wind, Trees), (*Trees, Drag), Aerodynamic characteristics, Diffusion, Fluid flow, Agriculture, Turbulent boundary layer, Wind tunnel models, Model tests, Configuration, Strain gages, Dynamometers, Test methods, Simulation, Force (Mechanics), Correlation techniques.

Identifiers: Shear flow, Canopy fields (Fluid flow), *Agricultural aerodynamics, Graphs (Charts).

The objective of this study was to determine distribution of the tree drag force within various model forest canopies subjected to various ambient wind conditions. Ultimately this information may be related to diffusion within the forest canopy. The influence on individual tree drag due to neighboring trees was investigated by arranging the trees in various configurations of columns and rows, the columns being parallel to the ambient wind and the rows being perpendicular. Two tree spacings for the columns and rows were investigated. Furthermore, a large forest canopy field was investigated that covered an area of twenty-one square meters. For this arrangement it was determined that the tree drag field can be classified into two zones - an initial zone and a steady decay zone. In order to study the influence of the boundary layer development on tree drag, the various arrangements of trees were tested under a thin boundary layer condition and under a thick boundary layer condition. In the course of this study a strain gage force dynamometer was developed that can reliably measure a drag force as small as 0.1 gram on a model tree. (Author)
AD-668 255 HC$3.00 MF$0.65

SURFACE RESPONSE OF AN ELASTIC MEDIUM TO NORMAL PRESSURES APPLIED OVER CONSTANT AND EXPANDING CIRCULAR AREA.
Weidlinger (Paul) New York
For primary bibliographic entry see Field 18C.
AD-668 256 HC$3.00 MF$0.65

HELIUM SUPERFLOW THROUGH SARAN CHARCOAL,
Royal Military Coll of Canada Kingston (Ontario)
M. H. Edwards, A. S. McKirdy, and W. C. Woodbury. 1965. 4p
Availability: Published in Low Temperature Physics-LT9 (Part A), p295-8 1965.

Descriptors: (*Helium, *Superfluidity), (*Porous materials, Superfluidity), Charcoal, Cryogenics, Liquefied gases, Vinyl plastics, Fluid flow, Adsorption, Canada.
Identifiers: Polyvinylidene chloride.

Saran charcoal is a highly porous solid with minimum pore constrictions 10-15 A across. A study was made to see whether liquid helium could flow through such small channels, and if so, whether the onset temperature for superflow would be below 2.17K. (Author)
AD-668 269 Not available from CFSTI.

FURTHER CALCULATIONS FOR HYDROGEN INJECTION INTO LAMINAR BOUNDARY LAYER FLOW,
California Univ San Diego La Jolla Dept of the Aerospace and Mechanical Engineering Sciences
Om O. Sharma. 1967. 8p
AROD-5133:166-P
Contract DA-31-124-ARO (D)-257
Availability: Published in Astronautica Acta, v13 p361-7 1967.

Descriptors: (*Laminar boundary layer, Injection), (*Hydrogen, Injection), Transport properties, Boundary value problems, Numerical methods and procedures, Stagnation point, Enthalpy, Chemical reactions, Hypersonic flight, Cooling, Protection.
Identifiers: Seedants, Blow-off.

Libby and Pierucci have studied a similar boundary layer with hydrogen injection and with chemical behavior idealized according to the flame sheet model but with relatively accurate transport properties. Because of difficulties with the forward integration scheme used for treating the two-point boundary value problem, their results were limited to low rates of injection. Their work was extended to higher values of the injection rate, up to 'blow-off', by using a different numerical procedure, and it also yielded modified results for low injection rates. (Author)
AD-668 289 Not available from CFSTI.

BASES OF GAS DYNAMICS AND THEIR APPLICATION TO THE CALCULATION OF SUPERSONIC WIND TUNNELS,
Foreign Technology Div Wright-Patterson AFB Ohio
I. A. Panichkin, and A. B. Syakhov. 12 Jul 67. 148p Rept no. FTD-MT-67-66
Edited machine trans. of mono. Osnovy Gazovoi Dinamiki i ikh Prilozhenie k Raschetu Aerodinamicheskikh Trub, Kiev, 1965 p1-152.

Descriptors: (*Supersonic wind tunnels, Gas flow), Supersonic characteristics, Equations of motion, One-dimensional flow, Thermodynamics, Nozzle gas flow, Shock waves, Reflection, Subsonic characteristics, Transonic characteristics, Reynolds number, Diffusers, Ejection, USSR.
Identifiers: Gas dynamics, Translations.

A textbook on the fundamentals of gas dynamics and their application to wind tunnel calculations. In part one, entitled 'one-dimensional motion of an ideal gas' the nature of an ideal gas is reviewed and equations pertaining to all aspects of flow are presented. In part two entitled 'gas dynamics of supersonic wind tunnels' the basic characteristics of wind tunnels are described. Various classifications of wind tunnels are discussed in detail. Methods of calculation of gas dynamics are presented in equations. A table of basic gas-dynamical functions for air is included as an appendix. (Author)
AD-668 292 HC$3.00 MF$0.65

A COMPUTER PROGRAM FOR THE NUMERICAL SOLUTION OF HYPERBOLIC PARTIAL DIFFERENTIAL EQUATIONS BY THE METHOD OF CHARACTERISTICS,
Naval Ordnance Lab White Oak Md
For primary bibliographic entry see Field 12A.
AD-668 324 HC$3.00 MF$0.65

HYPERSONIC PITCH-DAMPING SUPPORT USING WATER-COOLED BALL BEARINGS.
Data rept.,
Naval Ordnance Lab White Oak Md
Frank J. Regan, and Eugene V. Horanoff. 26 Jan 68. 35p Rept no. NOLTR-68-4

Descriptors: (*Hypersonic test vehicles, Pitch (Motion)), (*Wind tunnel models, *Supports), Conical bodies, Damping, Slender bodies, Performance (Engineering), Hypersonic characteristics, Ball bearings, Cooling, Stagnation point, Friction, Temperature control, Oscillation, Conical bodies, Thermal stresses.
Identifiers: *Pitch-damping support systems, Sharp bodies.

Free oscillation pitch-damping measurements were made on a nine degree half-angle cone at a Mach number of 8.0. The report discusses the design of the support, the water cooling system and its effectiveness in controlling the thermal environment of the bearings. In addition, an outline is given of a theoretical technique for calculation of the damping in pitch derivative for slender cones called the shock expansion method. Comparisons are made between theory and experiment. (Author)
AD-668 325 HC$3.00 MF$0.65

OSCILLATION OF CYLINDERS IN OR BELOW THE FREE SURFACE OF DEEP FLUIDS.
Naval Ship Research and Development Center Washington D C Hydromechanics Lab
For primary bibliographic entry see Field 13J.
AD-668 338 HC$3.00 MF$0.65

PERTURBATION SOLUTIONS AND ASYMPTOTIC SOLUTIONS IN BOUNDARY LAYER THEORY.
Scientific Interim rept.,
New York Univ N Y
L. Ting, and S. Chen. Mar 68. 19p
ARL-68-0043
Contract AF 33 (615)-2215
Availability: Published in Journal of Engineering Mathematics, v1 n4 p327-40 1967.

Descriptors: (*Boundary layer, Equations of motion), Perturbation theory, Asymptotic series, Boundary value problems, Pressure, Thermal conductivity, Linear systems, Optimization.
Identifiers: Blasius solutions.

Topics include: optimum one term asymptotic representation of linear flow of heat; series solutions of linear flow of heat; optimum Blasius solution.
AD-668 372 Not available from CFSTI.

A NOTE ON THE MIXING OF TWO PARALLEL SUBSONIC STREAMS,
New York Univ N Y
Lu Ting, and Charles J. Ruger. Feb 68. 8p
ARL-68-0035
Contract AF 33 (615)-2215
Availability: Published in Journal of Mathematics and Physics, v46 n3 p343-8 September 1967.

Descriptors: (*Jet mixing flow, Subsonic characteristics), Momentum, Interfaces, Equations of motion, Mathematical analysis, Incompressible flow.

The integration of the momentum equation is carried out so that explicit results can be obtained without the assumption of incompressibility for the mixing region of two subsonic parallel streams. This completes the determination of the interface for the mixing of two parallel streams. (Author)
AD-668 373 Not available from CFSTI.

AERODYNAMIC ROUGHNESS CRITERIA IN AEOLIAN SAND TRANSPORT,
Woods Hole Oceanographic Institution Mass
Robert J. Byrne. Apr 68. 9p Rept nos. WHOI-Ref-68-18, WHOI-Contrib-2006
Contracts Nonr-2196 (00), Nonr-2121 (26)
Availability: Published in Journal of Geophysical Research, v73 n2 p541-7 15 January 1968.

Descriptors: (*Sand, Transport properties), Surface roughness, Boundary layer transition, Reynolds number, Airspeed, Shear stresses, Laminar boundary layer, Wind, Erosion, Wind tunnels, Flat plate models, Viscosity, Density, Drag, Numerical analysis.
Identifiers: *Aeolian sand transport, Wind erosion.

It is widely stated in wind erosion studies that the boundary layer flow of surfaces of sand is aerodynamically rough at the inception of particle motion. At comparable roughness Reynolds numbers in water, however, the roughness state is considered as transitional. Clarification of the matter is important if the nature of fluid force acting on the surface particles is to be understood. In this study the boundary layer velocity profiles of published wind tunnel results are reanalyzed in terms of the relation between the roughness length z0 and the roughness Reynolds number. For aerodynamically rough flow, the ratio z0/k is expected to be constant as the roughness Reynolds number (V*k/v) varies. Most of the evidence indicates that the boundary flow is transitional rather than rough. Furthermore, the results do not follow the classical work of Nikuradse for uniform sand roughness. (Author)
AD-668 378 Not available from CFSTI.

ON A CONVERGENT MULTI-MOMENT METHOD FOR THE LAMINAR BOUNDARY LAYER EQUATIONS.

Scientific Interim rept.,
Aerospace Research Labs Wright-Patterson AFB Ohio
Howard E. Bethel. Feb 68, 27p Rept no. ARL-68-0040
Availability: Published in Aeronautical Quarterly, v18 p332-53 Nov 1967.

Descriptors: (*Laminar boundary layer, Equations of motion), Approximation (Mathematics), Prandtl number, Stagnation point, Shear stresses, Incompressible flow, Laminar flow, Moments.

The paper presents a summary of a multi-moment method for solving the laminar boundary layer equations. Results obtained with the method tend to converge to the exact values as higher moments are used. Both similar and non-similar external flow fields are considered. The present results are compared with those obtained by another multi-moment method, a finite-difference method and a refined Pohlhausen-type method. (Author)
AD-668 413 Not available from CFSTI.

THERMAL ESCAPE FROM PLANETARY ATMOSPHERES IN THE PRESENCE OF A GRAVITATIONAL FIELD.
Interim rept.,
Space Sciences Inc Waltham Mass
Sigi Ziering, and Pung Nien Hu. 3 Apr 68, 17p
AFOSR-68-0837
Contract AF 49 (638)-1666
Availability: Published in Astronautica Acta, v13 n4 p327-40 1967.

Descriptors: (*Gas flow, *Kinetic theory), Attrition, Exosphere, Planetary atmospheres, Gravity, Mathematical models, Mathematical analysis, Velocity, Knudsen number, Distribution functions.
Identifiers: *Thermal escape, Escape speed.

The effect of thermal escape in terrestrial and planetary atmospheres is studied by kinetic theory techniques. While the paper is primarily concerned with the escape of a minor constituent gas diffusing through a major constituent gas, an extension of the techniques to the self-escape problem of a single gas is discussed. It is assumed that the lighter gas constituent is fed by the mechanism of diffusion to escape altitudes; whence it escapes under steady state conditions. The effect of the gravitational field is retained in the formalism. (Author)
AD-668 414 Not available from CFSTI.

TABLES OF COLLISION INTEGRALS FOR THE (m, 6) POTENTIAL FOR TEN VALUES OF m.
National Bureau of Standards Washington D C
For primary bibliographic entry see Field 7D.
AD-668 433 HC$3.00 MF$0.65

MERGED STAGNATION SHOCK LAYER OF NONEQUILIBRIUM DISSOCIATING GAS,
Aerospace Corp El Segundo Calif El Segundo Technical Operations
For primary bibliographic entry see Field 22B.
AD-668 442 HC$3.00 MF$0.65

EVAPORATION OF A DROPLET IN FREE MOLECULAR FLOW,
Aerospace Corp El Segundo Calif Lab Operations
Kenneth P. Horn, Vladislaw Bevc, and Marc A. Koplin. Feb 68, 20p Rept no. TR-0158 (3220-10)-5
SAMSO-TR-68-146
Contract F04695-67-C-0158

Descriptors: (*Flow fields, Molecules), (*Drops, Evaporation), Spheres, Drag, Heat transfer, Atmosphere entry, Velocity, Mathematical analysis, Particles, Density, Fluid dynamic properties, Temperature, Intensity, Heat of vaporization, Water.

The problem of the evaporation of a moving spherical droplet in free molecular flow is studied. An exact solution for the reduction in the droplet size is derived by use of the free molecular limits for drag coefficient and modified Stanton number. An approximate solution is also presented that reduces the complexity of the velocity dependence in the heat transfer relation. Good agreement between the two solutions is demonstrated for a wide range of freestream temperatures. One particular case, using water as the droplet medium, is examined under reentry conditions. (Author)
AD-668 445 HC$3.00 MF$0.65

BOUNDARY LAYER CHARACTERISTICS FOR HYPERSONIC FLOW WITH AND WITHOUT MASS ADDITION.
Final rept.,
New York Univ N Y
Antonio Ferri, and Victor Zakkay. Jan 68, 91p
ARL-68-0002
Contract AF 33 (615)-2215

Descriptors: (*Jet mixing flow, Hypersonic characteristics), Boundary layer, Hypersonic flow, Mass transfer, Injection, Reynolds number, Axially symmetric flow, Laminar flow, Ablation, Perturbation theory, Three-dimensional flow, Turbulence, Angle of attack, Slender bodies.
Identifiers: Ablative materials, Seedants.

Problems connected with viscous hypersonic flow with and without mass addition were theoretically and experimentally investigated. Specific viscous flow phenomena investigated are: the boundary layer with large density gradients, the mixing in the presence of a wall, and the mixing of two fluids in the presence of pressure gradients. In the field of viscous flow with mass addition, nonsimilar, nonequilibrium, laminar boundary layers with surface ablation of subliming plastic materials were investigated analytically. In addition, research was performed in a spectrum of related fields. (Author)
AD-668 460 HC$3.00 MF$0.65

SMALL SHIELDED THERMOCOUPLE TOTAL TEMPERATURE PROBES,
Technion - Israel Inst of Tech Haifa Dept of Aeronautical Engineering
For primary bibliographic entry see Field 14B.
AD-668 466 HC$3.00 MF$0.65

SOLUTIONS OF THE SECOND-ORDER BOUNDARY-LAYER EQUATIONS FOR LAMINAR INCOMPRESSIBLE FLOW,
Naval Ordnance Lab White Oak Md
Michael J. Werle. 31 Jan 68, 192p Rept no. NOLTR-68-19

Descriptors: (*Boundary layer, *Incompressible flow), Laminar flow, Numerical analysis, Equations of motion, Momentum, Thickness, Shear stresses, Vortices, Flow separation.
Identifiers: Longitudinal curvature, Transverse curvature, Self-similar solutions.

Use is made of self similarity approach and integral momentum technique to obtain solutions of Van Dyke's second-order boundary-layer equations for laminar incompressible flow. Accurate numerical solutions of the most general self similar equations are tabulated for the four second-order contributions due to vorticity interaction, displacement speed, longitudinal curvature, and transverse curvature. A limited number of closed form solutions are obtained which appear to have special significance at the point of first-order boundary-layer separation. In particular it is found that the displacement speed problem can proceed up to separation for only two values of the second-order pressure gradient. All other cases display an infinite discontinuity at this point. Numerical solutions of a large number of cases for the longitudinal and transverse curvature effects well support an identical conclusion. The integral momentum technique applied (a straight forward extension of the Karmen-Pohlhausen solutions) is found to be oversensitive to approximations and in the final analysis is rejected in favor of locally similar solutions. (Author)
AD-668 498 HC$3.00 MF$0.65

ASYMPTOTICS OF THE WAKE OF A BODY MOVING IN RAREFIED PLASMA,
Foreign Technology Div Wright-Patterson AFB Ohio
For primary bibliographic entry see Field 20I.
AD-668 505 HC$3.00 MF$0.65

VORTEX EFFECTS IN A TURBINE STAGE,
Foreign Technology Div Wright-Patterson AFB Ohio
For primary bibliographic entry see Field 21E.
AD-668 511 HC$3.00 MF$0.65

CONVECTION PROCESSES IN TURBULENT IMPINGING JETS.
Imperial Coll. of Science and Technology, London (England). Dept. of Mechanical Engineering.
M. Wolfshtein. Nov 67, 237p SF/R/2

Descriptors: *Convective heat transfer, *Elliptic differential equations, *Finite difference theory, *Jet impingement, *Turbulent jets, Approximation, Couette flow, Kolmogoroff theory, Momentum transfer, Numerical analysis, Prandtl-meyer expansion, Problem solving, Turbulent flow, Two dimensional flow, Viscous flow, Wall flow.

For abstract, see STAR 06 10.
N68-19575 HC$3.00 MF$0.65

DYNAMIC PRESSURE OF A VOLUME WITH VARIOUS ORIFICES AND OUTGASSING MATERIALS.
National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
J. J. Scialdone. Nov 67, 27p NASA-TM-X-63133, X-327-67-574

Descriptors: *Dynamic pressure, *Outgassing, *Pressurized cabins, *Spacecraft cabins, Computer programs, Orifice flow, Orifices, Vacuum effects.

For abstract, see STAR 06 10.
N68-19704 HC$3.00 MF$0.65

EVALUATION OF BOUNDARY LAYER AND WAKE SURVEY DATA REDUCTION TECHNIQUES IN COMPRESSIBLE FLOWS.
National Aeronautics and Space Administration. Langley Research Center, Langley Station, Va.
For primary bibliographic entry see Field 1A.
For abstract, see STAR 06 10.
N68-19709 HC$3.00 MF$0.65

AN EXPERIMENT TO EXAMINE THE EFFECT OF POROUS TRAILING EDGES ON THE SOUND GENERATED BY BLADES IN AN AIRFLOW FINAL REPORT.
Wyle Labs., Inc., Huntsville, Ala.
For primary bibliographic entry see Field 1A.
For abstract, see STAR 06 10.
N68-19791 HC$3.00 MF$0.65

EXPLORING IN AEROSPACE ROCKETRY. 8 - ZERO GRAVITY EFFECTS.
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
W. J. Masica. 1968, 18p NASA-TM-X-52395

Descriptors: *Aerospace environments, *Liquid surfaces, *Weightlessness, Baffles, Capillary flow, Contact potentials, Cylindrical tanks, Fluid boundaries, Spherical tanks.

For abstract, see STAR 06 10.
N68-19795 HC$3.00 MF$0.65

NOTE ON CONDITIONS NEAR A SEPARATION LINE IN TWO-DIMENSIONAL TURBULENT FLOW.
National Physical Lab., Teddington (England). Aerodynamics Div.
P. Bradshaw. 2 May 67, 14p NPL-AERO-1232, ARC-29053
Prep- Prepared for Min. of Technol.

Descriptors: *Boundary layer separation, *Incompressible flow, *Turbulent flow, *Two dimensional flow, Divergence, Equations of motion, Pressure distribution, Shear stress, Streamlining.

For abstract, see STAR 06 10.
N68-19916 HC$3.00 MF$0.65

ON THE ACOUSTIC THEORY OF SUPERSONIC FLOW PAST SLENDER BODIES OF REVOLUTION AT SMALL ANGLES OF ATTACK.
Deutsche Versuchsanstalt Fur Luft- Und Raumfahrt, Aachen (West Germany). Institut Fuer Theoretische Gasdynamik.
For primary bibliographic entry see Field 1A.
For abstract, see STAR 06 10.
N68-20090 HC$3.00 MF$0.65

EXPERIMENTAL INVESTIGATIONS AND BOUNDARY LAYER THEORETICAL CALCULATIONS ON DECELERATING CASCADES AT COMPRESSIBLE FLOW, ESPECIALLY WHEN CHANGING THE RATIO OF AXIAL MASS FLOW DENSITY AND THE UPSTREAM INTENSITY OF TURBULENCE.
Deutsche Versuchsanstalt Fur Luft- Und Raumfahrt, Porz (West Germany). Institut Fuer Luftstrahlantriebe.
For primary bibliographic entry see Field 1A.
For abstract, see STAR 06 10.
N68-20091 HC$3.00 MF$0.65

ELDO INITIAL PROGRAM. F6/2 MULTISTAGE VEHICLE. RADIO FREQUENCY INTERFERENCE THEORETICAL STUDY - ASSEMBLED VEHICLE ON ITS OWN.
Selenia S. P. A., Rome (Italy).
8 Sep 67, 143p ELDO-RFI-11, TR-67/536/
Coll- 143 P Refs Prep- Prepared for Eldo

Descriptors: *Eldo launch vehicle, *Onboard equipment, *Radio frequency interference, *Transmitter receivers, Launch vehicle configurations, Signal analysis.

For abstract, see STAR 06 10.
N68-20102 HC$3.00 MF$0.65

ELDO INITIAL PROGRAM - TASK DEFINITION TD/B 10. ANTENNA DECOUPLING MEASUREMENTS ON THE ELDO VEHICLE SCALED MODEL (1)13,5/ - F6/1 CONFIGURATION.
Selenia S. P. A., Rome (Italy).
10 Nov 67, 21p ELDO-RFI-9A, TR-67/55F
Coll- 145 P Prep- Prepared for Eldo

Descriptors: *Antenna couplers, *Decoupling, *Eldo launch vehicle, *Signal measurement, *Turnstile antennas, European 1 spacecraft, Impedance matching, Radio frequency interference, Scale models.

For abstract, see STAR 06 10.
N68-20123 HC$3.00 MF$0.65

PERFORMANCE OF ANNULAR PLUG AND EXPANSION-DEFLECTION NOZZLES INCLUDING EXTERNAL FLOW EFFECTS AT TRANSONIC MACH NUMBERS.
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
For primary bibliographic entry see Field
For abstract, see STAR 06 10.
N68-20330 HC$3.00 MF$0.65

AN EXPERIMENTAL INVESTIGATION OF THE EFFECT OF GRAVITY ON A FORCED CIRCULATION PATTERN IN SPHERICAL TANKS.
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
K. L. Abdalla, S. G. Berenyi, and R. C. Nussle.
Apr 68, 25p NASA-TN-D-4409
Contract 124-09-03-01-22

Descriptors: *Flow distribution, *Gravitational effects, *Spherical tanks, Flow velocity, Inlet flow, Tank geometry, Test facilities, Wall jets.

For abstract, see STAR 06 10.
N68-20352 HC$3.00 MF$0.65

CALCULATION OF SUBSONIC FLUTTER DERIVATIVES FOR AN ARROWHEAD WING WITH CONTROL SURFACES.
National Physical Lab., Teddington (England). Aerodynamics Div.
For primary bibliographic entry see Field 1A.
For abstract, see STAR 06 10.
N68-20366 HC$3.00 MF$0.65

MATHEMATICAL MODEL FOR SIMULATING LIQUID SLOSHING IN A TANK.
Modele Mathematique pour La Representation Du Ballottement des Liquides Dans Un Reservoir de Forme Quelconque
Laboratoire de Recherches Balistiques Et Aerodynamiques, Vernon (France).
M. Boudet. 15 Jan 68, 77p NT-6/68/EN
Lang- in French

Descriptors: *Liquid sloshing, *Mathematical models, *Propellant tanks, Integral calculus, Linear equations, Liquid filled shells, Neumann problem, Numerical analysis, Pendulums, Rotating fluids, Rotation, Simulation, Translational motion.

For abstract, see STAR 06 10.
N68-20388 HC$3.00 MF$0.65

CALCULATIONS SHOWING THE INFLUENCE OF AERODYNAMIC DAMPING ON BINARY WING FLUTTER.
National Physical Lab., Teddington (England). Aerodynamics Div.
For primary bibliographic entry see Field 1A.
For abstract, see STAR 06 10.
N68-20394 HC$3.00 MF$0.65

A CALCULATION METHOD FOR THE INCOMPRESSIBLE TURBULENT BOUNDARY LAYER, INCLUDING THE EFFECT OF UPSTREAM HISTORY ON THE TURBULENT SHEAR STRESS.
National Physical Lab., Teddington (England). Aerodynamics Div.
A. G. Macdonald, and J. F. Nash. 11 May 67, 69p NPL-AERO-1234, ARC-29088

Descriptors: *Incompressible flow, *Integral calculus, *Turbulent boundary layer, *Two dimensional flow, Algol, Computer programs, Equilibrium flow, Linear prediction, Numerical analysis, Pressure distribution, Shear stress, Velocity distribution.

For abstract, see STAR 06 10.
N68-20516 HC$3.00 MF$0.65

DISCREPANCIES BETWEEN VISCOSITY DATA FOR SIMPLE GASES,
National Bureau of Standards, Boulder, Colo. Inst. for Materials Research.
For primary bibliographic entry see Field 7D.
PB-177 837 HC$3.00 MF$0.65

THE CHARACTERISTICS OF 78 RELATED AIRFOIL SECTIONS FROM TESTS IN THE VARIABLE-DENSITY WIND TUNNEL,
National Advisory Committee for Aeronautics, Washington, D. C.
For primary bibliographic entry see Field 1C.
PB-177 874 HC$3.00 MF$0.65

20E. Masers and Lasers

AN ANALYSIS OF SINGLE MODE OPERATION OF GAS LASERS.
Technical rept.,
Harry Diamond Labs Washington D C
R. T. Young, Jr. Dec 67, 27p Rept no. HDL-TR-1369

Descriptors: (*Gas lasers, Operation), Helium, Neon, Argon, Atomic energy levels, Ions, Excitation, Field theory, Bessel functions, Mirrors, Doppler effect, Bandwidth, Electromagnetic fields, Phase, Infrared radiation, Resonance absorption, Test methods, Experimental data, Performance (Engineering).
Identifiers: Thresholds.

An approximate higher order theory is applied to the single mode operation of gas lasers at both low and high power levels. Three cases are worked out: (a) Uniform field, uniform excitation; (b) Finite circular plane mirrors and a Bessel function radial variation of excitation; (c) Confocal mirrors. It is shown that there are two regimes of operation: output power varies with the square of the excitation rate, and output power is a linear function of the excitation rate. The quadratic type of operation occurs either for low power, or small ratio of atomic linewidth to Doppler bandwidth; the linear type for either high power or large ratio of linewidth to Doppler bandwidth. Two representative cases, a He-Ne laser and an Ar+ laser, are treated, and the results are compared with experimental data. (Author)
AD-667 948 HC$3.00 MF$0.65

THEORY OF NONLINEAR OPTICAL PHENOMENA IN EXTRINSIC SEMICONDUCTORS,
Foreign Technology Div Wright-Patterson AFB Ohio
For primary bibliographic entry see Field 20L.
AD-668 049 HC$3.00 MF$0.65

HYDROGEN DOPING AND PARAMAGNETIC PROPERTIES OF IONIC CRYSTALS AT HIGH TEMPERATURES,
Rome Air Development Center Griffiss AFB N Y
For primary bibliographic entry see Field 20L.
AD-668 122 HC$3.00 MF$0.65

LONG-TERM OPERATION OF A SEALED CO2 LASER.
Journal article,
Massachusetts Inst of Tech Lexington Lincoln Lab
Robert J. Carbone. 20 Jun 67, 4p Rept no. JA-3038
ESD-TR-68-2
Contract AF 19 (628)-5167
Revision of report dated 28 Apr 67.
Availability: Published in IEEE Journal of Quantum Electronics, vQE-3 n9 p373-5 1967.

Descriptors: (*Gas lasers, Operation), Carbon dioxide, Vacuum seals, Life expectancy, Nitrogen compounds, Oxygen compounds, Gases, Temperature, Interactions, Molecules, Helium, Absorption, Mass spectroscopy, Deposits, Carbon, Design, Cathode ray tubes.

The life expectancy of a sealed CO2 laser tube depends, to a great extent, on the interaction of the molecules existing in the discharge at the cathode. The data reported here indicates that after operation of a sealed laser, only CO and O2 are formed in concentrations comparable to the initial fill gases of CO2, N2, and He. The CO, CO2, and

O2, in particular, were found to be completely adsorbed at the Ni cathode within several hundred hours of tube operation. A loss of 10.6 micro m power output accompanied this absorption. As expected, the process was reversible to a degree since the laser resumed operation at the initial power level after the cathode region had been heated to 300C. This process of absorption-desorption was repeated several times up to an accumulated operating time of 705 hours. During this time, the power output remained at a substantially constant value. However, the loss of CO2 by carbon deposits ultimately means an end to tube life. (Author)
AD-668 195 Not available from CFSTI.

PHOTOELECTRIC CORRELATION MEASUREMENTS WITH TIME-TO-AMPLITUDE CONVERTERS.
Interim rept.,
Rochester Univ N Y Dept of Physics and Astronomy
F. Davidson, and L. Mandel. Mar 68, 10p Rept no. Scientific-7
AFCRL-68-0094
Contract AF 19 (628)-5052
Availability: Published in Journal of Applied Physics, v39 n1 p62-6 1968.

Descriptors: (*Lasers, Optical properties), Photoelectric effect, Measurement, Pulse height analyzers, Light pulses, Intensity, Mathematical analysis, Theory, Photons, Counting methods.
Identifiers: TAC (Time-to-amplitude converter), *Time-to-amplitude converters, Photon counting.

Photoelectric delayed coincidence measurements of an optical field with a time-to-amplitude converter are now becoming common, and yield results which are related to certain correlation functions of the field. The equations governing the measurements are obtained and some computational methods are developed which allow the correlations to be derived from measured data. The methods are illustrated by an example. (Author)
AD-668 411 Not available from CFSTI.

OPTICAL HARMONIC GENERATION AT A METAL SURFACE,
Rand Corp Santa Monica Calif
R. F. Lutomirski. Mar 68, 48p Rept no. RM-5595-ARPA
Contract DAHC15-67-C-0141, ARPA Order-189-1

Descriptors: (*Coherent radiation, Interactions), (*Light transmission, Metals), Lasers, Propagation, Reflection, Polarization, Cryogenics, Surface properties, Electric fields, Mathematical models, Harmonic generators.
Identifiers: Maxwells equations, Boltzmann equation, Nonlinear optics, Second harmonic generation.

The memorandum presents a calculation of the classical interaction between laser light and a metal. Using a simple model for the statistics of the conduction electrons and their nteraction with the surface, Maxwell's equations and the Boltzmann equation are solved self-consistently for the fields in the metal, yielding the usual Fresnel solutions plus correction terms which, at optical frequencies and above liquid helium temperatures, are shown to be of the order of one percent. When laser light of sufficient intensity is used, a nonlinear polarization is induced and waves of twice the fundamental frequency are produced. For the indicated model and for normal incidence, the second harmonic waves in the metal are calculated and the magnitude of the relative heating is computed. The method for solving the general problem for an arbitrary incidence angle is outlined and the ratio of the average energy flux reflected in the second harmonic to the incident flux is estimated. The relevance to a high-intensity laser experiment is considered and an error in the computation of the reflection coefficient as obtained by Jha is discussed. (Author)
AD-668 420 HC$3.00 MF$0.65

INVESTIGATION OF SOLID STATE DEVICES AND MATERIALS.
Northeastern Univ Boston Mass
For primary bibliographic entry see Field 9A.
AD-668 437 HC$3.00 MF$0.65

THE OPTICAL SPECTRUM AND ZEEMAN EFFECT OF CaF2:Eu (2+).
Aerospace Corp El Segundo Calif Lab Operations
For primary bibliographic entry see Field 20L.
AD-668 443 HC$3.00 MF$0.65

HOLOGRAPHY OF MOVING OBJECTS.
Institut Franco-allemand de Recherches, St. Louis (France).
For primary bibliographic entry see Field 14E.
For abstract, see STAR 06 10.
N68-20318 HC$3.00 MF$0.65

INVESTIGATION OF AIR-FLOW VELOCITY BY LASER BACKSCATTER.
National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
For primary bibliographic entry see Field 4B.
For abstract, see STAR 06 10.
N68-20375 HC$3.00 MF$0.65

20F. Optics

SCATTERING STUDIES.
Sylvania Electronic Systems-West Mountain View Calif Electronic Defense Labs
For primary bibliographic entry see Field 0N.
AD-667 943 HC$3.00 MF$0.65

INSTABILITY OF DISCHARGE WITH AN INCANDESCENT CATHODE IN A MAGNETIC FIELD AT LOW PRESSURES,
Foreign Technology Div Wright-Patterson AFB Ohio
For primary bibliographic entry see Field 20H.
AD-668 028 HC$3.00 MF$0.65

THEORY OF NONLINEAR OPTICAL PHENOMENA IN EXTRINSIC SEMICONDUCTORS,
Foreign Technology Div Wright-Patterson AFB Ohio
For primary bibliographic entry see Field 20L.
AD-668 049 HC$3.00 MF$0.65

CATALOGUE OF PARAMETERS OF POLARIZED LIGHT REFLECTED BY TERRESTRIAL ROCKS,
Foreign Technology Div Wright-Patterson AFB Ohio
For primary bibliographic entry see Field 3B.
AD-668 051 HC$3.00 MF$0.65

AN EVALUATION OF THE OPERATIONAL UTILITY OF DIRECT READOUT INFRARED SATELLITE DATA.
Air Weather Service Scott AFB Ill
For primary bibliographic entry see Field 4B.
AD-668 125 HC$3.00 MF$0.65

POLARIZATION AND INTENSITY OF RAMAN SCATTERING FROM PLASMONS AND PHONONS IN GALLIUM ARSENIDE.
Massachusetts Inst of Tech Lexington Lincoln Lab
For primary bibliographic entry ee Field 20L.
AD-668 193 Not available from CFSTI.

RESEARCH IN MATERIALS SCIENCE AND ENGINEERING.
Massachusetts Inst of Tech Cambridge
For primary bibliographic entry see Field 11G.
AD-668 215 HC$3.00 MF$0.65

HIGH-SPEED SURVEY OF PLASMA IN SOFT X-RAY AND ULTRAVIOLET REGION,
Foreign Technology Div Wright-Patterson AFB Ohio
M. I. Pergament, and A. I. Yaroslavskii. 11 Aug 67, 18p Rept no. FTD-MT-24-86-67
Edited machine trans. of Vysokoskorostnaya Semka Plazmy v Oblasti Myagkogo Retgena i Ultrafioleta, Moscow, 1966 p1-12.

Descriptors: (*Optical equipment, Plasma physics), (*Plasma physics, Instrumentation), Photographic techniques, Image converters, X rays, Ultraviolet radiation, Plasma medium, Temperature, Diagrams, Photocathodes, Phosphorescent materials, Image intensifiers (Electronics), Information theory, X-ray filters, Ultraviolet filters, USSR.
Identifiers: Translations, Camera obscuras, Luminophors.

As plasma temperature rises its radiation spectrum shifts to the shortwave region which is difficult to study. Of special interest is the range of ultraviolet and soft x-ray. High speed survey is a requirement. The authors suggest an electrical-optical converter (EOP) with window for admission of x-radiation. However, it is possible to use a standard EOP if, with the help of a luminophor, the radiation is converted to correspond to the sensitivity of the photocathode. Such an arrangement is described.
AD-668 234 HC$3.00 MF$0.65

OPTICAL PLASMA INTERFEROMETRY,
Foreign Technology Div Wright-Patterson AFB Ohio
For primary bibliographic entry see Field 20I.
AD-668 290 HC$3.00 MF$0.65

SYSTEM FOR HIGH-SPEED REGISTRATION OF SPECTRAL-LINE CONTOURS,
Foreign Technology Div Wright-Patterson AFB Ohio
For primary bibliographic entry see Field 20I.
AD-668 291 HC$3.00 MF$0.65

AN F/2 FOCAL REDUCER FOR THE 60-INCH U. S. NAVAL OBSERVATORY TELESCOPE.
Arizona Univ Tucson Optical Sciences
For primary bibliographic entry see Field 17H.
AD-668 383 HC$3.00 MF$0.65

PHOTOELECTRIC CORRELATION MEASUREMENTS WITH TIME-TO-AMPLITUDE CONVERTERS.
Rochester Univ N Y Dept of Physics and Astronomy
For primary bibliographic entry see Field 20E.
AD-668 411 Not available from CFSTI.

OPTICAL HARMONIC GENERATION AT A METAL SURFACE,
Rand Corp Santa Monica Calif
For primary bibliographic entry see Field 20E.
AD-668 420 HC$3.00 MF$0.65

ANGULAR DISTRIBUTION OF RADIATION REFLECTED FROM CARBON DIOXIDE CRYODEPOSITS FORMED ON 77K SURFACES.
Final rept. Jun 67-Jan 68,
Arnold Engineering Development Center Arnold Air Force Station Tenn
Apr 68, 63p Rept no. AEDC-TR-68-46
Contract AF 40 (600)-1200
Prepared in cooperation with ARO, Inc., Tullahoma, Tenn.

Descriptors: (*Carbon dioxide, Solidified gases), (*Solidified gases, Optical properties), Cryopumping, Space simulation chambers, Substrates, Copper, Reflection, Backscattering, Thickness, Contamination.
Identifiers: Interferometry.

The angular distribution of light reflected from carbon dioxide cryodeposits formed at various rates on polished copper and black substrates has been measured for various cryodeposit thicknesses and angles of incidence. Cryodeposits were found to reflect light essentially diffusely at thicknesses greater than about 100 microns. The specular reflection from both polished copper and black substrates could be reduced by as much as two orders of magnitude by a 100-micron-thick cryodeposit. Bragg interference, backscattering, scattering interference, and shifts of the angular location of the specular component were all observed and illustrated that light reflection from cryodeposits is a very complex phenomenon. (Author)
AD-668 432 HC$3.00 MF$0.65

ATMOSPHERIC PATH RADIANCE CALCULATIONS FOR A MODEL ATMOSPHERE,
Radiation Research Associates Inc Fort Worth Tex
For primary bibliographic entry see Field 4A.
AD-668 482 HC$3.00 MF$0.65

NONSELECTIVE OPTICAL-ACOUSTIC RECEIVER WITH AN OPTICAL MICROPHONE,
Foreign Technology Div Wright-Patterson AFB Ohio
N. A. Pankratov. 16 Jun 67, 34p Rept no. FTD-MT-67-62
Edited machine trans. of Optiko-Mekhanicheskaya Promyshlennost (USSR), n1 p37-48 1960.

Descriptors: (*Infrared equipment, USSR), Microphones, Infrared radiation, Optical images, Antimony, Sensitivity, Optical equipment components, Infrared detectors, Acoustic equipment, Sensors, Detection, Absorption, Lenses, Diffraction gratings, Photomultipliers, Diaphragms (Mechanics), Mirrors, Diagrams.
Identifiers: Translations.

The paper describes a non-selective optico-acoustic receiver of infrared radiation. The instrument consists of a radiation absorption chamber and an optical microphone. A diagram of the optical system is shown. An intermittent stream of radiation passes through fluorite window and is absorbed by a thin layer of aluminum applied to an extremely thin celluloid substrate, which is located in the optico-acoustic chamber. Pressure pulsations are generated by absorption of the radiation in the chamber. These pulsations cause celluloid diaphragm to oscillate. This diaphragm, which is coated with a reflecting layer of antimony, is simultaneously one of the walls of the chamber and also the diaphragm of the microphone. A transparent glass grating is located in the focal plane of lens, which is separated from diaphragm by a distance of 15 mm. An image of light source is projected through the grating onto the diaphragm by condenser lens. This image is then reflected through the second half of the grating to mirror and from there through iris to single-stage photomultiplier. The vibration of the microphone diaphragm causes a periodic displacement of the image along the optical axis which results in oscillations of the light flux sent from the auxiliary source to the photomultiplier. (Author)
AD-668 509 HC$3.00 MF$0.65

REPLICA GRATING STUDY INTERIM REPORT, 1 JUL. - 31 DEC. 1967.
College of the Holy Cross, Worcester, Mass.
R. C. Gunter, Jr.. 15 Feb 68, 18p NASA-CR-93782
Contract NGR-22-091-002

Descriptors: *Gratings (spectra), *Replicas, *Thermal stresses, *Vacuum effects, Artificial satellites, Atmospheric pressure, Borosilicate glass, Irradiation, Silicon dioxide.

For abstract, see STAR 06 10.
N68-20053 HC$3.00 MF$0.65

FUNDAMENTAL STUDIES RELATING PARTICLE SIZE EFFECTS TO INFRARED SPECTRA SEMIANNUAL REPORT, 1 JUN. - 30 NOV. 1967.
Stanford Univ., Calif. Remote Sensing Lab.
15 Jan 67, 24p NASA-CR-93773
Contract NGR-05-020-237

Descriptors: *Infrared spectra, *Particle size distribution, *Powder (particles), *Spectrometers, Computer programs, Data processing, Digital data, Electronic equipment, Optical properties, Rocks, Size determination, X ray analysis.

For abstract, see STAR 06 10.
N68-20277 HC$3.00 MF$0.65

EVALUATION OF THE EFFECTS OF SPACE ENVIRONMENT EXPOSURE ON INDEX OF REFRACTION AND EXTINCTION COEFFICIENTS OF APOLLO WINDOW MATERIALS.
General Dynamics Corp., San Diego, Calif.
J. Compton, P. Mahadevan, J. T. Neu, and E. J. Philbin. Apr 68, 112p NASA-CR-1019, GDC-DBE-67-001
Contract NAS9-4948
Coll- 112 P Refs

Descriptors: *Extinction, *Radiation effects, *Refractivity, *Temperature effects, *Windows (apertures), Aluminum silicates, Apollo spacecraft, Silica glass, Transmittance, Vycor.

For abstract, see STAR 06 10.
N68-20467 HC$3.00 MF$0.65

20G. Particle Accelerators

ELECTROSTATIC FOCUSING OF HOLLOW SPIRALING ELECTRON BEAMS.
Triannual rept. no. 3, 1 Aug-30 Nov 67,
City Coll Research Foundation New York
Morris Ettenberg. Mar 68, 27p
ECOM-0159-3
Contract DAAB07-67-C-0159
See also AD-662 244.

Descriptors: (*Electron beams, *Focusing), Electron guns, Design, Electrons, Particle trajectories, Space charges, Computer programs, Electrostatics, Electrodes.

The detailed design for an end fire experimental gun was completed. All the parts have been machined and only final assembly remains to be accomplished before vacuum testing. The computer program for trajectory plotting including space charge effects has been completed. A sample computer calculation is included as an appendix to this report. (Author)
AD-667 906 HC$3.00 MF$0.65

ACCELERATION OF ELECTRONS OF PLASMA,
Foreign Technology Div Wright-Patterson AFB Ohio
For primary bibliographic entry see Field 20I.
AD-668 120 HC$3.00 MF$0.65

ANNUAL REPORT, JULY 1, 1967.
Brookhaven National Lab., Upton, N. Y.
or primary bibliographic entry see Field 6R.
For abstract, see NSA 22 08.
BNL-50057 HC$3.00 MF$0.65

AXIAL INJECTION STUDIES ON THE 88-INCH CYCLOTRON HOLE LENS,
California Univ., Berkeley. Lawrence Radiation Lab.
Alfredo U. Luccio. 2 Jan 68, 11p
Contract W-7405-eng-48

Descriptors: (*Cyclotrons, Particle trajectories), Injection, Charged particles, Equations of motion, Magnetic fields, Excitation, Particle accelerator components, Lenses, Voltage, Protons, Electron optics, Mathematical analysis, Galvanometers.

For abstract, see NSA 22 08.
UCRL-18016 HC$3.00 MF$0.65

20H. Particle Physics

AZIMUTHALLY DEPENDENT MODES ON UNIFORM SOLID ELECTRON BEAMS.
Army Electronics Command Fort Monmouth N J
For primary bibliographic entry see Field 20C.
AD-667 905 HC$3.00 MF$0.65

ELECTROSTATIC FOCUSING OF HOLLOW SPIRALING ELECTRON BEAMS.
City Coll Research Foundation New York
For primary bibliographic entry see Field 20G.
AD-667 906 HC$3.00 MF$0.65

INSTABILITY OF DISCHARGE WITH AN INCANDESCENT CATHODE IN A MAGNETIC FIELD AT LOW PRESSURES,
Foreign Technology Div Wright-Patterson AFB Ohio
M. A. Vlasov, E. I. Dobrokhotov, and A. V. Zharinov. 10 Aug 67, 37p Rept no. FTD-MT-67-75
Edited machine trans. of Nuclear Fusion (Austria) v6 p24-34 1966.

Descriptors: (*Magnetic fields, *Electric discharges), Gas discharges, Pressure, Stability, Cathodes (Electron tubes), Intensity, Plasma jets, Electron beams, Models (Simulations), Polarization, USSR, Thermonuclear reactions.
Identifiers: Translations.

Results are given of the investigation of gas discharge with an incandescent cathode in equipotential volume in a magnetic field with an intensity of up to 2000 Oe. In the investigated range of pressures from .0000021 to .001 torr there will be formed a plasma column negatively charged relative to the surrounding walls. It is established that such a discharge with an increased pressure of neutral gas becomes unstable. A steadily revolving plasma jet to the electron side pulled out from the region of the first beam will be formed. The appearance of the jet is the result of polarization of plasma in the beam of primary electrons in the presence of azimuthal heterogeneity of density and the difference in drift speeds of ions and electrons. With a further increase in pressure the stationary rotation vanishes and in the discharge there are developed intense oscillations with a continuous spectrum of frequencies. There is given an explanation of the basic regularities of behavior of the discharge. On the basis of the simplified model an expression is obtained for the frequency of rotation of the jet, which is qualitatively confirmed by the experiment. (Author)
AD-668 028 HC$3.00 MF$0.65

THE APPLICATION OF NUCLEAR MAGNETIC RESONANCE (YAMR) FOR DIFFERENTIAL MEASUREMENTS IN THE MAGNETIC FIELD OF THE EARTH,
Foreign Technology Div Wright-Patterson AFB Ohio
For primary bibliographic entry see Field 8N.
AD-668 160 HC$3.00 MF$0.65

ASYMMETRIC PHOTOPRODUCTION OF MUON PAIRS OFF HYDROGEN AS A TEST OF QUANTUM ELECTRODYNAMICS.
Technical rept.,
Stanford Univ Calif High Energy Physics Lab
Daniel James Quinn. Apr 68, 142p Rept no. HEPL-534
Contract Nonr-225 (67)

Descriptors: (*Gamma-proton reactions, *Field theory), (*Photonuclear reactions, Muons), (*Muons, Pair production), Hydrogen, Photons, Differential cross section, Nuclear spectroscopy, Theses.
Identifiers: Photoproduction.

The paper describes an experiment, performed at the Stanford Mark III electron linear accelerator, which measured the differential cross section for the asymmetric photoproduction of muon pairs from a hydrogen target, gamma-ray + p to negative-muon + positive-muon + p. The negative-muon was detected under conditions where the positive-muon and proton were non-relativistic in the laboratory. The experiment was performed as a test of quantum electrodynamics. (Author)
AD-668 169 HC$3.00 MF$0.65

CONDITIONS FOR THE VALIDITY OF THE WEINBERG SUM RULES,
Harvard Univ Cambridge Mass Dept of Physics
Robert Perrin. 18 Mar 68, 4p
AFOSR-68-0757
Contract AF 49 (638)-1380
Availability: Published in Physical Review Letters, v20 n6 p306-8 5 February 1968.

Descriptors: (*Decay schemes, Algebras), (*Pions, Interactions), Groups (Mathematics), Identities, Mathematical models.
Identifiers: *Sum rules, Current algebras.

It is shown that if the validity of the Jacobi identity for riple equal-time commutators is assumed, then the proof of the sum rule g (A sub 1)sq.) + g (rho)sq. is not affected by the presence of I = 1 Schwinger terms, while the proof of the sum rule g ((A sub 1)sq.)/m ((A sub 1)sq. + 1/2f (pi sq.) = g ((rho)sq.)/m ((rho)sq.) requires the assumption that if an I = 1 pseudoscalar Schwinger term exists, then its coupling to the pion is much weaker than that of the axial-vector current. (Author)
AD-668 216 Not available from CFSTI.

SCHWINGER TERMS FROM LOCAL CURRENTS.
Boston Univ Mass Dept of Physics
For primary bibliographic entry see Field 20J.
AD-668 222 Not available from CFSTI.

COMPLEX ANGULAR MOMENTUM AND INFINITE HELICITY SUMS,
Cambridge Univ (England) Dept of Applied Mathematics and Theoretical Physics
Ian T. Drummond, and G. A. Winbow. 5 Mar 68, 12p
AFOSR-68-0779
Grant AF-EOAR-36-65
Availability: Published in The Physical Review, v161 n5 p1401-10 25 September 1967.

Descriptors: (*Decay schemes, Integrals), Field theory, Momentum, Elementary particles, Great Britain.
Identifiers: Angular momentum, Helicity, Unitarity.

Previous discussions of the continuation to complex angular momentum of three-particle unitarity integrals for simple diagrams are reformulated in terms of infinite helicity sums. This is achieved by a redefinition of the partial-wave projection of the production amplitudes. It is found that the helicity sums can be made to converge by suitable choice of complex contours for the phase-space integral. It is shown that this leads to the same results as found previously without the introduction of helicity sums. (Author)
AD-668 313 Not available from CFSTI.

GAMMA RAY FIELDS ABOVE ROUGH CONTAMINATED SURFACES,
Naval Radiological Defense Lab San Francisco Calif
For primary bibliographic entry see Field 18H.
AD-668 327 HC$3.00 MF$0.65

1f7/2 AND 2p3/2 STATES IN ODD-A NUCLEI FROM 33S TO 41CA,
Aerospace Research Labs Wright-Patterson AFB Ohio
D. D. Watson, and F. D. Lee. Mar 68, 7p Rept no. ARL-68-0045
Availability: Published in Physics Letters, v25B n7 p472-4 Oct 16 1967.

Descriptors: (*Nuclear energy levels, Predictions), Nuclear shell models, Nuclear spectroscopy, Excitation, Nuclear spins, Sulfur, Chlorine, Argon, Potassium, Calcium, Strontium.

A number of energy levels of d-shell nuclei exhibit prominent single-particle 1f7/2 or 2p3/2 characteristics. A single particle description is used to fit the known energy levels and from this fit the energies of other possible 1f7/2 and 2p3/2 states are predicted. (Author)
AD-668 368 Not available from CFSTI.

ISOBARIC ANALOG STATES IN Cl35,
Aerospace Research Labs Wright-Patterson AFB Ohio
D. D. Watson, J. C. Manthuruthil, and F. D. Lee. Feb 68, 12p Rept no. ARL-68-0036
Availability: Published in Physical Review, v164 n4 p1399-1407 Dec 20 1967.

Descriptors: (*Chlorine, *Nuclear isobars), Sulfur, Proton bombardment, Gamma emission, Gamma-ray spectra, Nuclear energy levels, Decay schemes, Nuclear resonance, Nuclear spins, Parity, Isomeric transitions.

The gamma-ray yield from the S34 (p, gamma)Cl35 reaction shows strong resonances at proton energies of 1214 and 1512 keV. These resonance states occur at the correct energies to be isobaric analogs of the 1.99- and 2.35-MeV states in S35, respectively. Angular distribution, triple-correlation, and polarization measurements were performed at each of these resonances.
AD-668 371 Not available from CFSTI.

SOLUTION OF COUPLED EQUATIONS BY R-MATRIX TECHNIQUES,
Florida State Univ Tallahassee Dept of Physics
P. J. A. Buttle. Aug 67, 13p
AFOSR-68-0851
Grants AF-AFOSR-440-67, NSF-GP-5114
Availability: Published in The Physical Review, v160 n4 p719-29 Aug 20 1967.

Descriptors: (*Nuclear reactions, Matrix algebra), Nuclear cross sections, Equations, Nuclear energy levels, Nuclear scattering.
Identifiers: *R-matrix.

A realistic coupled-equation problem is solved using various R-matrix and level-matrix techniques. Comparison with exact coupled-equation calculations shows that excellent numerical results are possible with these methods, both in resonant and in nonresonant energy regions. The effects of varying the R-matrix boundary conditions and the number of levels included in the calculation are considered. Various aspects of R-matrix theory, such as the composition of R-matrix states, and the interference between neighboring levels, are illustrated by the calculations. (Author)
AD-668 410 Not available from CFSTI.

TABLES OF COLLISION INTEGRALS FOR THE (m, 6) POTENTIAL FOR TEN VALUES OF m.
National Bureau of Standards Washington D C
For primary bibliographic entry see Field 7D.
AD-668 433 HC$3.00 MF$0.65

ANNUAL REPORT, JULY 1, 1967.
Brookhaven National Lab., Upton, N. Y.
For primary bibliographic entry see Field 6R.
For abstract, see NSA 22 08.
BNL-50057 HC$3.00 MF$0.65

REACTIVITY WORTH OF A CENTRAL SAFETY ROD WITH AND WITHOUT AN INTERNAL SCATTERER,
Battelle-Northwest, Richland, Wash. Pacific Northwest Lab.
V. O. Uotinen, and A. L. Pitner. Feb 68, 21p
Contract AT (45-1)-1830

Descriptors: (*Nuclear reactions, *Safety), Plutonium, Rods, Cadmium, Nuclear scattering, Plastics, Feasibility studies, Mathematical analysis, Effectiveness, Configuration.

For abstract, see NSA 22 08.
BNWL-618 HC$3.00 MF$0.65

MACS J. A PROGRAM FOR COMPUTING CRYSTAL PHONON DISPERSION RELATIONS, STRUCTURE FACTORS FOR NEUTRON INELASTIC SCATTERING, AND JACOBIAN MATRICES,
Idaho Nuclear Corp., Idaho Falls.
J. K. Boyter, and A. W. Solbrig, Jr. Jan 68, 23p
Contract AT (10-1)-1230

Descriptors: (*Crystal lattices, Transport properties), (*Computer programs, Crystal lattices), Phonons, Dispersion relations, Neutron scattering, Inelastic scattering, Matrix algebra.
Identifiers: Jacobian matrices, FORTRAN.

For abstract, see NSA 22 08.
IN-1147 HC$3.00 MF$0.65

CALCULATION OF NEUTRON POLARIZATIONS USING A LOCAL OPTICAL POTENTIAL WITH AVERAGE PARAMETERS,
Los Alamos Scientific Lab., N. Mex.
Jerome G. Beery, Katherine H. Harper, and Virginia M. Stovall. Oct 67, 397p
Contract W-7405-eng-36

Descriptors: (*Neutron cross sections, Tables), Neutron scattering, Polarization, Nuclear energy levels.

For abstract, see NSA 22 08.
LA-3788 HC$3.00 MF$0.65

TOTAL REACTION CROSS SECTIONS FOR PROTONS BETWEEN 10 MeV AND 22 MeV ON 12 C AND 40 Ca,
Los Alamos Scientific Lab., N. Mex.
John F. Dicello, Jr. Jan 68, 148p
Contract W-7405-eng-36

Descriptors: (*Proton cross sections, Nuclear models), Calcium, Proton scattering, Nuclear energy levels.

For abstract, see NSA 22 08.
LA-3842 HC$3.00 MF$0.65

NUCLEAR LEVELS OF DY162.
Upjohn Co., Kalamazoo, Mich. Inst. of Physics.
A. Baecklin, U. Gruber, B. P. Maier, O. W. Schult, and A. Suarez. 1967, 37p TID-23909, LF-DC-8526

Descriptors: *Atomic energy levels, *Dysprosium isotopes, Gamma rays, Ground state, Nuclear reactions, Radiation detectors, Spectrometers.

For abstract, see STAR 06 10.
N68-19505 HC$3.00 MF$0.65

A DAUGHTER REGGE TRAJECTORY IN THE BETHE- SALPETER EQUATION.
Laboratoire de Physique Theorique Et des Hautes Energies, Orsay (France).
M. Fontannaz. Jan 68, 29p TH/233

Descriptors: *Bethe-salpeter equation, *Field theory (algebra), *Mathematical models, *Number theory, *Regge poles, Algebra, Approximation, Linear transformations, Scattering cross sections.

For abstract, see STAR 06 10.
N68-19569 HC$3.00 MF$0.65

RELATIVISTIC RIGID SPHERE AS AN EXAMPLE OF THE UNIFIED MODEL OF ELEMENTARY PARTICLES.
Nihon Univ., Tokyo (Japan).
T. Goto, O. Hara, S. Y. Tsai, and H. Yabuki. 1967, 45p NUP-A-68-1

Descriptors: *Elementary particles, *Mathematical models, *Relativistic theory, *Rigid structures, Dirac equation, Equations of motion, Quantum mechanics, Spheres.

For abstract, see STAR 06 10.
N68-19625 HC$3.00 MF$0.65

EMISSION OF PHOTONS AND ELECTRON POSITRON PAIRS IN A MAGNETIC FIELD.
Izlucheniye Fotonov I Elektronno-pozitronnykh Par V Magnitnom Pole
National Aeronautics and Space Administration, Washington, D. C.
N. P. Klepikov. Mar 68, 23p NASA-TT-F-11618 Tran- Transl. Into English From Zh. Eksperim. Teor. Fiz. (Moscow), V. 26, No. 1, 1954 P 19-34

Descriptors: *Annihilation reactions, *Electron photon cascades, *Magnetic fields, *Pair production, *Photoelectrons, *Quantum mechanics, Electron emission, Elementary particles, Luminous intensity, Photons, Positron annihilation, Relativistic theory, Theoretical physics.

For abstract, see STAR 06 10.
N68-19751 HC$3.00 MF$0.65

DIPS IN THE C EQUALS - 1 EXCHANGE CONTRIBUTION OF TWO-BODY INELASTIC PROCESSES. 2 - KN YIELD KN AND B-CONSPIRACY.
Laboratoire de Physique Theorique Et des Hautes Energies, Orsay (France).
A. P. Contogouris, H. J. Lubatti, and J. Tran Thanh Van. Jan 68, 13p REPT.-68/4

Descriptors: *Inelastic scattering, *Momentum transfer, *Regge poles, *Theoretical physics, Elementary particles, Kaon production, Neutrons, Predictions, Scattering cross sections, Two body problem.

For abstract, see STAR 06 10.
N68-19766 HC$3.00 MF$0.65

FOUNDATIONS OF A TWO-TEMPERATURE STATISTICAL MODEL.
Maryland Univ., College Park. Physics and Astronomy Dept.
J. R. Wayland. Feb 68, 41p NASA-CR-93762, TR-803
Grant NSG-695

Descriptors: *Mathematical models, *Proton-proton reactions, *Spectrum analysis, Cosmic rays, Functions (mathematics), Particle energy, Temperature profiles.

For abstract, see STAR 06 10.
N68-20294 HC$3.00 MF$0.65

SUPERCONVERGENT SUM RULE FOR PION PHOTOPRODUCTION ON LAMDA 0 PLUS.
International Centre for Theoretical Physics, Trieste (Italy).
P. P. Srivastava. Mar 67, 5p IC/67/19
Subm- Submitted for Publication

Descriptors: *Convergence, *Photoproduction, *Pions, *Sums, Magnetic moments, Regge poles, Series (mathematics).

For abstract, see STAR 06 10.
N68-20438 HC$3.00 MF$0.65

COUPLING PROBLEM FOR U/P,Q/ LADDER REPRESENTATIONS. PART 2 - LIMITATIONS ON THE COUPLING OF U/P,Q/ LADDERS.
International Centre for Theoretical Physics, Trieste (Italy).
R. L. Anderson, and R. Raczka. Mar 67, 12p IC/67/10
Subm- Submitted for Publication Spon- Sponsored in Part By Nsf

Descriptors: *Baryons, *Elementary particle interactions, *Operators (mathematics), Antiparticles, Commutators, Conjugates, Fine structure, Leptons, Lie groups, Mesons, Scalars, Yukawa potential.

For abstract, see STAR 06 10.
N68-20439 HC$3.00 MF$0.65

ON THE RE-ARRANGEMENT ENERGY OF THE NUCLEAR MANY-BODY PROBLEM.
International Centre for Theoretical Physics, Trieste (Italy).
M. E. Grypeos. Apr 67, 14p IC/67/14
Subm- Submitted for Publication

Descriptors: *Many body problem, *Nuclear binding energy, *Wave functions, Internuclear properties, Mathematical models, Nucleons, Perturbation theory, Variational principles.

For abstract, see STAR 06 10.
N68-20440 HC$3.00 MF$0.65

PHOTOMESON-PRODUCTION BY THE UNIVERSAL MICROWAVE THERMAL RADIATION FIELD AND THE HIGH-ENERGY COSMIC RAY SPECTRUM.
National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
F. W. Stecker. Feb 68, 12p NASA-TM-X-63145, X-641-68-69

Descriptors: *Cosmic rays, *High energy interactions, *Mesons, *Microwaves, *Photons, *Pions, *Thermal radiation, Bibliographies, Protons.

For abstract, see STAR 06 10.
N68-20484 HC$3.00 MF$0.65

RECENT DEVELOPMENTS IN THEORETICAL NUCLEAR PHYSICS.
International Centre for Theoretical Physics, Trieste (Italy).
A. De-shalit. Dec 66, 20p IC/66/110
Conf- Presented At the 52d Meeting of the Italian Phys. Soc., Trieste, Italy, Oct. 1966

Descriptors: *Many body problem, *Nuclei (nuclear physics), *Nucleon-nucleon interactions, Charged particles, Hamiltonian functions, Nuclear binding energy, Nuclear interactions, Quantum mechanics, Schroedinger equation.

For abstract, see STAR 06 10.
N68-20528 HC$3.00 MF$0.65

NCDATA - NUCLEAR COLLISION DATA FOR NUCLEON-NUCLEUS COLLISIONS IN THE ENERGY RANGE 25 TO 400 MeV,
Oak Ridge National Lab., Tenn.
R. G. Alsmiller, Jr., and J. Barish. Feb 68, 29p
Contract W-7405-eng-26

Descriptors: (*Nuclear reactions, *Computer programs), Neutrons, Protons, Nuclei, Interactions, Nuclear cross sections, Nuclear spectroscopy.

For abstract, see NSA 22 08.
ORNL-4220 HC$3.00 MF$0.65

ELECTRONOPTICAL SYSTEMS FOR RECORDING HIGH-SPEED PROCESSES,
Lockheed Missiles and Space Co., Palo Alto, Calif.
For primary bibliographic entry see Field 14E.
PB-176 848T HC$3.00 MF$0.65

AXIAL INJECTION STUDIES ON THE 88-INCH CYCLOTRON HOLE LENS,
California Univ., Berkeley. Lawrence Radiation Lab.
For primary bibliographic entry see Field 20G.
For abstract, see NSA 22 08.
UCRL-18016 HC$3.00 MF$0.65

20I. Plasma Physics

HYDROMAGNETIC SURFACE WAVES IN A CONDUCTING LIQUID SURROUNDED BY A FLOWING GAS,
Boeing Scientific Research Labs Seattle Wash Plasma Physics Lab
Richard Gerwin. Jan 68, 53p Rept no. D1-82-0699

Descriptors: (*Magnetohydrodynamics, Interfaces), Magnetic fields, Liquids, Gas flow, Electrical conductance, Equations of motion, Perturbation theory, Dispersion relations, Stability, Sound, Surface properties.
Identifiers: Alfven waves.

The stability of the interface between a highly conducting liquid and a flowing, non-conducting gas is studied, supposing a magnetic field to be parallel to the interface. Arbitrary angles are allowed between magnetic field, flow direction and wave-vector. (Author)
AD-667 954 HC$3.00 MF$0.65

ALFVEN WAVES IN RELATIVISTIC PLASMAS,
Boeing Scientific Research Labs Seattle Wash Plasma Physics Lab
F. C. Hoh. Feb 68, 18p Rept no. D1-82-0709

Descriptors: (*Magnetohydrodynamics, Relativity theory), Dispersion relations, Damping, Plasma medium, Velocity, Energy, Propagation, Acoustic properties.
Identifiers: Alfven waves, Landau damping.

Expressions for Alfven waves, its Landau damping, and magnetosonic waves are derived in a homogeneous relativistic Vlasov plasma. Relativistic effects reduce the speed of both waves. (Author)
AD-667 955 HC$3.00 MF$0.65

THE EXPERIMENTAL INVESTIGATION OF THE INFLUENCE OF A LONGITUDINAL MAGNETIC FIELD ON CONVECTION HEAT TRANSFER DURING TURBULENT FLOW OF A CONDUCTING FLUID IN A PIPE,
Foreign Technology Div Wright-Patterson AFB Ohio
D. S. Kovner, E. Yu. Krasilnikov, and I. G. Panevin. 11 Aug 67, 16p Rept no. FTD-MT-24-189-67
Edited machine trans. of Magnitnaya Gidrodinamika (Latvian SSR) v2 n4 p101-6 1966.

Descriptors: (*Magnetohydrodynamics, *Convection (Heat transfer)), Magnetic fields, Turbulence,

Pipes, Reynolds number, Thermal insulation, Thermocouples, USSR.
Identifiers: Translations, Peclet number.

The influence of a longitudinal magnetic field on convection heat transfer during turbulent flow of a conducting liquid in a pipe is studied, and an empirical formula for calculation of the heat transfer is subsequently offered. In general, at a constant Hartman number, the influence of the magnetic field decreases as the Reynolds and Peclet numbers increase. (Author)
AD-668 052 HC$3.00 MF$0.65

INVESTIGATION OF THE ENERGY DISTRIBUTION OF COAXIAL-SOURCE HYDROGEN PLASMA,
Foreign Technology Div Wright-Patterson AFB Ohio
I. M. Zolototrubov, A. B. Rastrepin, and I. P. Skoblik. 11 Jul 67, 17p Rept no. FTD-MT-24-107-67
Edited machine trans. of Akademiya Nauk URSR, Kiev. Fiziko-Tekhnicheskii Instytut. Doklady, n81 p1-10 1964.

Descriptors: (*Plasma generators, *Hydrogen), (*Plasma medium, Energy), Vortices, Plasma accelerators, Distribution, Injection, Gas discharges, Ionic current, Spectroscopy, USSR.
Identifiers: Plasma guns, Plasmoids, Translations.

Energy partition in the hydrogen plasma produced in a coaxial gun is investigated in an apparatus that includes an ion energy spectrum analyzer. The plasma gun operates at 80 ka and the current period is 0.000013 sec. An active impedance reduces the third half-period to 10% of the initial amplitude. 0.8 cc of hydrogen gas is injected into the highly evacuated chamber at various intervals before the application of the voltage pulse to the gun electrodes. The ions generated in the discharge are analyzed in the ion energy detector using the magnetic field to produce selective deflection of the ions and the ion current is detected by CsI crystal optically coupled to a photomultiplier. This detector was also used to determine the time of formation of the ions in the gun by determining the time between the start of the discharge and the peak of the ion current. The energy spectrum for H1 (+) ions for delay times of 0.000085 to 0.000285 sec is given. Additionally, it is shown that for short delays (85 per sec) the dominating spectrum occurs during the current maximum. For longer delays, the emergence of spectrum is delayed also. The observations are carried out for both polarities of the axial electrodes. Some difference in the spectrum is observed. Both polarities give a two-peak distribution for the shortest delay times. The major peaks occur at 10 kev. (Author)
AD-668 057 HC$3.00 MF$0.65

ABOUT THE MOTION OF PLASMOIDS IN FIELD-FREE SPACE,
Foreign Technology Div Wright-Patterson AFB Ohio
Yu. S. Azovskii, I. T. Guzhovskii, Yu. P. Malazov, and V. M. Pistryak. 21 Jul 67, 20p Rept no. FTD-MT-24-108-67
Edited machine trans. of Akademiya Nauk URSR, Kiev. Fiziko-Tekhnicheskii Instytut. Doklady, n49 p1-13 1964.

Descriptors: (*Plasma medium, *Magnetohydrodynamics), Vortices, Ejection, Magnetic fields, Thermodynamics, Motion, Equations of motion, Density, Doppler effect, USSR.
Identifiers: Plasmoids, Translations.

The speed of current sheets of a given density was determined by observing the main part of a plasmoid which moves in field-free space. After the ejection of a plasmoid from the source, it initially moved into a glass tube of 9 cm diameter, then into an organic glass tube of 18 cm diameter. Hydrogen was used in the experiment. In the experimental conditions, the first dense plasmoid ejected was studied. It occured during the third half-period of the discharge. Sheets of different densities move with different speeds; those of lower density are faster. With the increase of retardation (neutral gas injection into the source) the speeds of both sheets decrease. The greatest delay occurs in the small diameter glass tube. This results in a decrease of the curvature of the plasmoid front. The motion of sheets was measured by the microwave reflection doppler effect. The use of the speed of sound in plasma to characterize plasmoid thermal expansion is discussed. (Author)
AD-668 060 HC$3.00 MF$0.65

ON THE QUESTION OF THE CONSTRUCTION OF A STATIONARY MAGNETOHYDRODYNAMIC MODEL OF A CYCLONE,
Foreign Technology Div Wright-Patterson AFB Ohio
A. G. Khantadze. 29 Aug 67, 8p Rept no. FTD-HT-67-75
Edited trans. of Akademiya Nauk Gruzinskoi SSR, Tiflis. Soobshcheniya, v36 n2 p273-8 1964, tr. by E. Harter.

Descriptors: (*Cyclones, Mathematical models), (*Magnetohydrodynamics, Mathematical models), Atmosphere models, Vector analysis, Magnetic fields, Compressible flow, Rotation, USSR.
Identifiers: Translations.

The motion of a rotating, perfectly conducting, compressible fluid in the presence of body forces and a plane magnetic field is investigated by vector multiplication. The author obtains two equations leading to the determination of the velocity and magnetic field. From these, the stationary motion of a conducting fluid is determined. The author finds the solution for the specific volume and total pressure. It is concluded that the center of rotation describes a circle with angular velocity Omega (z).
AD-668 067 HC$3.00 MF$0.65

OPERATION OF COAXIAL PLASMA SOURCE IN A LONGITUDINAL MAGNETIC FIELD,
Foreign Technology Div Wright-Patterson AFB Ohio
I. M. Zolototrubov, V. A. Kiselev, Yu. M. Novikov, and V. T. Tolok. 21 Jul 67, 15p Rept no. FTD-MT-24-103-67
Edited machine trans. of Akademiya Nauk URSR, Kiev. Fiziko-Tekhnicheskii Institut. Doklady, n8 p1-8 1964.

Descriptors: (*Plasma generators, Performance (Engineering)), Crossed field devices, Magnetic fields, Electric fields, Vortices, Plasma medium, Azimuth, Gas ionization, Charged particles, Hydrogen, Impurities, Line spectrum, USSR.
Identifiers: *Plasma guns, Plasmoids, Translations.

To produce a plasmoid with a relatively small number of impurities and neutral particles, a new construction was developed, in which the coaxial plasma gun is placed in a longitudinal magnetic field, with an aim of having the rotation of the plasma in the crossed electric and magnetic fields symmetrize the discharge in azimuth and increase the degree of ionization and the magnitude of the transverse component of the particle energy. A field up to 8000 G was produced by discharging a capacitor bank. The working gas was hydrogen. The gun-current oscillogram shows the typical plateau characterizing rotation of the plasma in the crossed fields. The rotation of the plasma was measured with external probes and the propagation of the plasma in the azimuthal direction was investigated by high-speed photography. The experiment showed that when the coaxial source is placed in a longitudinal magnetic field the plasma rotates in azimuthal direction, the discharge occurs over the entire length of the gun and is symmetrical with respect to the periphery of the electrodes. This contributes to a cleaner plasma. Spectrograms of the discharge showed that the magnetic field does decrease the intensity of the iron and chromium lines in the plasma spectrum. A shortcoming of the source is the small longitudinal plasmoid velocity (10 to the 7th power cm/sec) and insufficient ionization. (Author)
AD-668 100 HC$3.00 MF$0.65

ACCELERATION OF ELECTRONS OF PLASMA,
Foreign Technology Div Wright-Patterson AFB Ohio
A. M. Stefanovskii. 12 Sep 67, 34p Rept no. FTD-MT-67-81
Edited machine trans. of mono. Uskorenie Elektronov Plazmy, Moscow, 1964 36p.

Descriptors: (*Plasma medium, Acceleration), Electron beams, Gas ionization, Plasma accelerators, Electrons, Plasma oscillations, Magnetic pinch, Electric fields, Electric currents, Betatrons, USSR.
Identifiers: Translations.

The acceleration of plasma electrons was studied in toroidal units where the equilibrium of the electron beam in the circular orbit is achieved with image currents arising in the metal housing around the vacuum chamber. The preliminary plasma was developed in a toroidal magnetic field by injecting electrons along the lines of force of this field and ionizing a neutral gas in the chamber. In the first series of experiments it was observed that the overwhelming majority of the plasma electrons are not accelerated after an electric field up to 150 v/cm is developed, while powerful oscillations are excited in the plasma. In the second series, the accelerating electric field was created uniformly and simultaneously along the pinch of preliminary plasma. Comparison of the plasma density with the measurement of currents arising in the plasma indicates that all the plasma electrons are initially accelerated by the electric field. It is postulated that the effects observed may be very important for obtaining large accelerated currents in plasma betatrons. (Author)
AD-668 120 HC$3.00 MF$0.65

RADIO PROPAGATION IN RE-ENTRY PLASMAS,
Boeing Scientific Research Labs Seattle Wash Plasma Physics Lab
For primary bibliographic entry see Field 17B.
AD-668 162 HC$3.00 MF$0.65

HIGH-SPEED SURVEY OF PLASMA IN SOFT X-RAY AND ULTRAVIOLET REGION,
Foreign Technology Div Wright-Patterson AFB Ohio
For primary bibliographic entry see Field 20F.
AD-668 234 HC$3.00 MF$0.65

OPTICAL PLASMA INTERFEROMETRY,
Foreign Technology Div Wright-Patterson AFB Ohio
G. G. Dolgov-Savelev, E. P. Kruglyakov, V. K. Malinovskii, and V. M. Fedorov. 10 Aug 67, 15p Rept no. FTD-MT-24-83-67
Edited machine trans. of mono. Opticheskaya Interferometriya Plazmy, Novosibirsk, 1966 p1-13.

Descriptors: (*Plasma medium, *Interferometers), Electron density, Gas ionization, Light, Sources, Thermonuclear reactions, Design, USSR.
Identifiers: *Interferometry, Translations.

In addition to its other uses, optical interferometry is finding application in thermonuclear research for the measurement of plasma electron concentration. By use of this technique it is possible to determine the total number of electrons in the direction of light propagation, and when the transverse dimension is known. Another important parameter, the degree of plasma ionization, can also be determined. The article includes a description of interferometers and their light sources (optical quantum

generators). Future prospects for optical interferometry are discussed briefly. (Author)
AD-668 290 HC$3.00 MF$0.65

SYSTEM FOR HIGH-SPEED REGISTRATION OF SPECTRAL-LINE CONTOURS,
Foreign Technology Div Wright-Patterson AFB Ohio
E. P. Kruglyakov, and Yu. E. Nesterikhin. 10 Aug 67, 15p Rept no. FTD-MT-24-84-67
Edited machine trans. of mono. Sistema dlya Sverhskorostnoi Registratsii Konturov Spektralnykh Linii, Novosibirsk, 1966 p1-12.

Descriptors: (*Plasma physics, Line spectrum), (*Line spectrum, Optical equipment), Electrooptics, Electronic equipment, Flow visualization, Electronic recording systems, Chemical reactions, Density, Temperature, Design, Operation, Photomultipliers, Signal-to-noise ratio, USSR.
Identifiers: Plasma diagnostics, Double converters, Translations.

During experiments with high-temperature plasma investigation of spectra of fast-flowing chemical reactions, as well as other aspects, make it necessary to record the form of spectral lines in periods shorter than the time duration of the process being investigated. Such demands require a device with high time resolution and large amplification. Spectral lines can be used in a number of cases to determine density and temperature of plasma. In the article a description is given of an improved device, a double converter, its construction, and principles of operation. The device tested showed that with its help it becomes possible to produce registration of contours of spectral lines in times up to 10 to the -8th power s and less. The double converter also permits multiple recording of both separate lines and also sections of spectrum, and it can be used for study of flow in cylindrically symmetric objects. Finally, it can serve as a photomultiplier with improved signal-to-noise ratio during study of weakly luminescent objects. (Author)
AD-668 291 HC$3.00 MF$0.65

TRANSVERSE MOTION OF PLASMA IN A MAGNETIC FIELD,
Foreign Technology Div Wright-Patterson AFB Ohio
L. I. Elizarov, and A. V. Zharinov. 8 Dec 67, 19p Rept no. FTD-MT-67-77
Edited machine trans. of Nuclear Fusion (Austria) suppl. pt2 p699-704 1962.

Descriptors: (*Plasma oscillations, Magnetic fields), (*Plasma jets, Stability), Gas discharges, Magnetohydrodynamics, Probes, Ionic current, Pressure, Intensity, Hydrogen, Configuration, Motion, USSR.
Identifiers: Plasmascopes, Translations.

A report is given of preliminary experiments using a plasmascope to investigate the transverse motion of plasma in a discharge with a hot cathode in a longitudinal magnetic field. It was determined that in the presence of a critical magnetic field a plasma jet is formed steadily revolving in the ionic direction. The form of the jet and the period of rotation depend on the magnetic field intensity. Comparison of oscillograms revealed that pressure and magnitude of the discharge current also essentially affect the form of the jet. With the help of the plasmascope thus far only a discharge in hydrogen was studied, mainly for the purpose of testing and adjusting the new method. Hence some discrepancies and contradictions were noted. One obvious conclusion, however, is that the observed processes of transverse motion do not have anything in common with diffusion, but are a manifestation of the instability of the configuration of the plasma. (Author)
AD-668 293 HC$3.00 MF$0.65

EXCITATION OF HYDROMAGNETIC WAVES IN THE EARTH'S UPPER ATMOSPHERE BY SOURCES OF FINITE EXTENT,
Texas Univ Austin Electrical Engineering Research Lab
H. D. Holden, and F. X. Bostick. 1 Apr 68, 85p Rept no. 146
Contract Nonr-375 (14)

Descriptors: (*Electromagnetic waves, Upper atmosphere), (*Magnetohydrodynamics, Upper atmosphere), Excitation, Ionosphere, Mathematical analysis, Power spectra, Boundary value problems, Theory, Electric fields, Sources, Earth models.

A boundary value problem based on a model of the earth's upper atmosphere is posed, formulated and solved. A point source is included within the stratified model thus necessitating a full three-dimensional treatment. (This is often an unnecessary complication if one can assume incident plane waves, current sheets, or other sources infinite in extent). By formulating the problem in circular cylindrical coordinates, symmetrys are maximized and double integral inversions are avoided. Due to the earth's static magnetic field, the ionospheric media are anisotropic and the wave equation reduces to a dyadic Helmholtz equation. Seto (1964) has shown this equation to be separable in cylindrical coordinates under certain conditions. This important contribution by Seto is reviewed, somewhat extended, and adapted to the problem at hand. The separation equations lead directly to a dispersion relation. Electromagnetic field ratios (sometimes called wave impedances for an E/H ratio) are derived for an incremental cylinder wave. The boundary condition requirements are satisfied for the layered media numerically by using computational matrices. The advantages and limitations of this method are described. This is followed by a discussion of the contour used in the numerical evaluation of the integral. The vertical inhomogeneities in electrical parameters encountered in the ionosphere are quite severe. To accurately represent a continuously varying medium with a series of homogeneous layers each layer must be relatively thin in terms of wavelength.
AD-668 332 HC$3.00 MF$0.65

AN EXPERIMENTAL STUDY OF THE BEHAVIOR OF LARGE NEGATIVE IONS.
Technical rept (Final) 15 Jun 65-15 Jun 67,
Franklin GNO Corp West Palm Beach Fla
Rama K. Asundi, Robert W. Crowe, and Martin J. Cohen. 15 Dec 67, 22p Rept no. 272-F
Contract Nonr-4924 (00)

Descriptors: (*Halogenated hydrocarbons, Ions), (*Plasma generators, Ions), Freons, Gas ionization, Photoelectrons, Gas discharges, Fluorine compounds, Ions.
Identifiers: *Electronhydrodynamic generators.

Electron attachment properties and mobility studies of ions, formed in high molecular weight fluorocarbon compounds and drifting through a light medium, were made using a drift tube experiment. The reduced mobilities are found to be lower than the predictions of the small ion theory of Langevin. Using the experimentally determined mobility, the stage efficiency, and pressure ratios for a linear EHD device were evaluated when the device uses ions formed in Freon E-3. (Author)
AD-668 339 HC$3.00 MF$0.65

UNIFIED SHOCK PROFILE IN A PLASMA,
Space Sciences Inc Waltham Mass
Harold Grad, and Pung Nien Hu. 19 Mar 68, 10p AFOSR-68-0845
Contract AF 49 (638)-1666
Availability: Published in The Physics of Fluids, v10 n12 p2596-2602 Dec 1967.

Descriptors: (*Plasma medium, *Shock waves), Propagation, Interactions, Damping, Plasma oscillations, Thickness, Scale, Equations of motion.

Previously (P.N.Hu, Phys. Fluids 9, 89 (1966)), a universal monotonic profile was found for a weak plasma shock propagating perpendicular to a magnetic field using an elaborate set of moment equations which included electron and ion viscosity, coupled electron and ion heat conduction, thermal diffusion, and resistivity, together with distant Hall terms for the resistivity, stress, and heat flow. Inclusion of an additional term related to electron inertia now gives a one-parameter family of profiles which spans the entire range from collision dominated monotonic profiles to damped oscillatory profiles and the limiting collisionless case of purely oscillatory and solitary wave profiles. (Author)
AD-668 415 Not available from CFSTI.

BOUNDARY PHENOMENA IN MHD GENERATORS.
Stanford Univ Calif Plasma Gasdynamics Lab
For primary bibliographic entry see Field 10B.
AD-668 454 HC$3.00 MF$0.65

ASYMPTOTICS OF THE WAKE OF A BODY MOVING IN RAREFIED PLASMA,
Foreign Technology Div Wright-Patterson AFB Ohio
Yu. M. Panchenko. 17 Jul 67, 23p Rept no. FTD-MT-67-44
Edited machine trans. of mono. Issledovaniya Kosmicheskogo Prostranstva, Moscow, 1965 p254-64.

Descriptors: (*Magnetohydrodynamics, Wake), (*Aerodynamic configurations, Plasma medium), Superaerodynamics, Space charges, Kinetic theory, Electron density, Perturbation theory, Cylindrical bodies, Spheres, USSR.
Identifiers: Translations.

At present there is interest in investigation of the structure of the trace formed behind a body moving in a plasma. The finding of perturbations of electron and ionic concentration in plasma leads to solution of a system of disordered kinetic equations for the distribution function of charged particles and Poisson's equation for self-consistent potential. An important parameter of this problem is also the Debye radius, i.e. the distance over which the field of a point charge is chielded. Solution of the problem in the common form is very difficult since the system of equations describing perturbation is multi-dimensional and essentially nonlinear. This work gives a more detailed investigation of the structure of the trace in the distant zone. (Author)
AD-668 505 HC$3.00 MF$0.65

EXPERIMENTAL STUDY OF A TRANSPIRATION-COOLED, CONSTRICTED ARC.
Interim rept. Apr 65-Jun 67,
Minnesota Univ Minneapolis Heat Transfer Lab
G. G. Bruber, E. Pfender, and E. R. G. Eckert.
Feb 68, 114p
ARL-68-0023
Contracts AF 33 (657)-7380, F33615-67-C-1353

Descriptors: (*Plasma generators, Cooling), (*Electric arcs, Plasma generators), Evapotranspiration, Heat flux, Porous materials, Mathematical models, Pressure, Distribution, Argon, Ceramic materials, Performance (Engineering), Plasma jets.
Identifiers: *Transpiration-cooled arcs, Pressure distribution.

Experimental work with a transpiration-cooled arc is described. An apparatus was developed which verifies the analytical prediction that an electric arc can be confined and constricted by an entirely transpiration-cooled wall. The arc was operated in argon atmosphere with currents ranging from 35 to 160 A. A porous ceramic (ALSIMAG 447) tube was used as constrictor material. The investigations encompass basic trends of the arc, the constrictor performance, and the flow be-

havior with their mutual interactions. By introducing some simplifying assumptions, a number of formulae, containing observable quantities were derived which are useful for the representation of experimental results and which facilitate their comparison with analytical studies. Three different types of arc characteristics are plotted and used for a description of the transpiration-cooled arc. Results of spectrometric temperature measurements in the arc jet using the 5 mm ID constrictor tube are also included. Details of an improved transpiration-cooled arc arrangement based on previous experience, are described and some preliminary results obtained with this apparatus are reported. (Author)
AD-668 510 HC$3.00 MF$0.65

THE ELECTRICAL CONDUCTIVITY OF A COLLISIONLESS MAGNETOPLASMA IN A WEAKLY TURBULENT MAGNETIC FIELD.
Stanford Univ., Calif. Inst. for Plasma Research.
C. E. Newman, and P. A. Sturrock. Mar 68, 20p NASA-CR-93719, SU-IPR-227
Grant NSG-703

Descriptors: *Collisionless plasmas, *Electrical resistivity, *Magnetic fields, *Plasmas (physics), Distribution functions, Electric fields, Mathematical models, Particle diffusion, Turbulence effects.

For abstract, see STAR 06 10.
N68-19706 HC$3.00 MF$0.65

FREQUENCY MULTIPLICATION IN HIGH-ENERGY ELECTRON BEAMS SEMIANNUAL PROGRESS REPORT, 1 APR. - 1 OCT. 1967.
Michigan Univ., Ann Arbor. Electron Physics Lab.
W. D. Getty, R. J. Lomax, and J. E. Rowe. Feb 68, 17p NASA-CR-93743, SAPR-2
Contract NGR-23-005-183

Descriptors: *Beam plasma amplifiers, *Electron beams, *Frequency multipliers, *Harmonic generations, *High energy electrons, Cyclotron frequency, Harmonic oscillation.

For abstract, see STAR 06 10.
N68-19962 HC$3.00 MF$0.65

CYCLOTRON HARMONIC WAVE PROPAGATION AND INSTABILITIES.
Stanford Univ., Calif. Inst. for Plasma Research.
J. A. Tataronis. Dec 67, 199p NASA-CR-93818, SU-IPR-205
Contracts NGR-05-020-077, AT/04-3/-326

Descriptors: *Electrostatic charge, *High temperature plasma, *Magnetic fields, *Space charge, Collisionless plasmas, Electron plasma, Plasma frequencies, Plasma physics, Propagation modes, Wave propagation.

For abstract, see STAR 06 10.
N68-20176 HC$3.00 MF$0.65

MODEL STUDIES OF LOW ENERGY PLASMA IN THE OUTER MAGNETOSPHERE.
Pennsylvania State Univ., University Park. Ionosphere Research Lab.
J. M. Grebowsky. 15 Mar 68, 151p NASA-CR-93819, SR-317
Grant NSG-134-61, Contract NSF GP-5611

Descriptors: *Electric fields, *Magnetosphere, *Plasmas (physics), Atmospheric models, Distribution functions, Electron density (concentration), Field theory (physics), Magnetospheric proton density, Plasma interactions.

For abstract, see STAR 06 10.
N68-20287 HC$3.00 MF$0.65

A COAXIAL-FLOW-STABILIZED ARC.
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
C. D. Lanzo. Apr 68, 20p NASA-TN-D-4517
Contract 122-28-02-17-22

Descriptors: *Arc discharges, *Coaxial flow, *Electric arcs, Alternating current, Argon, Current distribution, Electrodes, Flow distribution, Flow visualization, Helium, Nitrogen, Velocity distribution.

For abstract, see STAR 06 10.
N68-20296 HC$3.00 MF$0.65

EQUATION OF STATE OF A DENSE MULTIPLY IONIZED PLASMA.
Comitato Nazionale Per L Energia Nucleare, Frascati (Italy). Lab. Gas Ionizzati.
J. G. Linhart. Jul 67, 18p LGI-67/14
Spon- Sponsored in Part By Euratom

Descriptors: *Equations of state, *Ionized gases, *Plasma physics, *Thomas-fermi model, Adiabatic conditions, Charged particles, Electron density profiles, Electron distribution, High temperature plasmas, Plasma clouds, Plasma density.

For abstract, see STAR 06 10.
N68-20302 HC$3.00 MF$0.65

THE EXPERIMENTAL AND ANALOG STUDIES OF HEAT FLOW IN THE CATHODE OF A PLASMATRON.
Analogowe I Modelowe Badania Przeplywu Ciepla W Katodzie Palnika Plazmowego
Polish Academy of Sciences, Warsaw. Inst. of Nuclear Research.
A. Strupczewski. 1967, 43p INR-855/11A/PP
Lang- in Polish, English Summary

Descriptors: *Analog simulation, *Heat transfer coefficients, *Network analysis, *Plasmatrons, Cathodes, Flow geometry, Heat transfer, Plasma jets, Temperature distribution.

For abstract, see STAR 06 10.
N68-20303 HC$3.00 MF$0.65

INSTABILITY OF A NEUTRAL SHEET.
Comitato Nazionale Per L Energia Nucleare, Frascati (Italy). Laboratori Gas Ionizzati.
M. Dobrowolny. Sep 67, 34p LGI-67/17
Spon- Sponsored in Part By Euratom

Descriptors: *Magnetohydrodynamic stability, *Neutral particles, *Plasma layers, Magnetic fields, Mathematical models, Numerical analysis, Particle trajectories, Perturbation.

For abstract, see STAR 06 10.
N68-20416 HC$3.00 MF$0.65

MICRO-FIELD FLUCTUATIONS IN STABLE NON-EQUILIBRIUM PLASMAS.
Comitato Nazionale Per L Energia Nucleare, Frascati (Italy). Lab. Gas Ionizzati.
M. Bornatici, and F. Engelmann. Oct 67, 23p LGI-67/18
Spon- Sponsored in Part By Euratom

Descriptors: *Electric fields, *Nonequilibrium plasmas, *Plasma-particle interactions, Classical mechanics, Distribution functions, Fluctuation theory, Fourier transformation, Laplace transformation, Longitudinal waves, Magnetohydrodynamic stability, Maxwell equation, Normalizing (statistics), Polarization (waves), Transverse waves.

For abstract, see STAR 06 10.
N68-20460 HC$3.00 MF$0.65

MULTICHANNEL DIGITAL TIMERS.
Comitato Nazionale Per L Energia Nucleare, Frascati (Italy). Lab. Gas Ionizzati.
J. E. Van Montfoort, and R. J. Verbeek. Jul 67, 37p LGI-67/15
Spon- Sponsored in Part By Euratom

Descriptors: *Digital command systems, *Plasma physics, *Timing devices, *Trigger circuits, Actuators, Data processing equipment, Data systems, Integrated circuits, Logic circuits, Time measurement, Time signals, Vibration mode.

For abstract, see STAR 06 10.
N68-20472 HC$3.00 MF$0.65

20J. Quantum Theory

ON SUBALGEBRAS WHICH SURVIVE CONTRACTION,
California Univ Berkeley Dept of Physics
Gabor Domokos, and Graham L. Tindle. 27 Mar 67, 8p
AFOSR-68-0764
Grant AF-AFOSR-232-66
Availability: Published in Commun. Math. Phys., v7 p160-3 1968.

Descriptors: (*Groups (Mathematics), Algebras), (*Algebras, Theorems), Transformations (Mathematics), Relativity theory, Quantum mechanics, Invariance.
Identifiers: SL (2C) algebra, Relativistic scattering theory, Lie algebras, Eigenvalues.

The following theorem is proven: if a subalgebra V of an algebra G is spanned by root vectors, then if X is a regular element of G, the limit lim as t approaches infinity of the quantity Ad exp tX (B) exists and is isomorphic to B, i.e. B 'survives' contraction with X. The algebra SL (2C) considered as an example. In particular it is shown that SL (2C) itself survives and applications to relativistic scattering theory are indicated. (Author)
AD-668 042 Not available from CFSTI.

MODULAR VARIABLES IN QUANTUM THEORY.
Final rept. 1 Jun 65-31 May 67,
Yeshiva Univ New York Belfer Graduate School of Science
Yakir Aharonov, and Aage Petersen. Nov 67, 54p
AFCRL-68-0127
Contract AF 19 (628)-5143

Descriptors: (*Quantum mechanics, Interactions), Potential theory, Wave functions, Electromagnetic fields, Momentum, Charged particles, Equations of motion.

The non-local aspects of interaction between quantum systems are investigated. These aspects are particularly conspicuous in quantum phenomena without a classical analog, such as the quantum effects of electromagnetic potentials. The study of the potential effect leads to the introduction of a new type of dynamical variables, modular variables, which are suitable to express the physical features of the quantum mechanical non-locality. The potential effect is reviewed and the question of whether the effect can be described as an exchange of otherwise conserved dynamical quantities is discussed. It is shown that this can be done in terms of modular momentum. Some fundamental properties of modular variables are investigated. In particular it is demonstrated that for these variables the quantum equations of motion are essentially different from the classical ones, and that modular momentum may commute with modular position. It is own how the peculiar properties of modular momentum enable us to predict new quantum effects with no classical analog, such as radiationless acceleration of charged particles. The concept of modular energy is introduced and its usefulness is shown by suggesting new interesting quantum effects. The two-slit electron interference experiment is discussed in terms of modular

momentum. Some further applications of modular variables are outlined, and the difference between classical and quantum mechanical non-locality is considered.
AD-668 099 HC$3.00 MF$0.65

ASYMMETRIC PHOTOPRODUCTION OF MUON PAIRS OFF HYDROGEN AS A TEST OF QUANTUM ELECTRODYNAMICS.
Stanford Univ Calif High Energy Physics Lab
For primary bibliographic entry see Field 20H.
AD-668 169 HC$3.00 MF$0.65

CONDITIONS FOR THE VALIDITY OF THE WEINBERG SUM RULES.
Harvard Univ Cambridge Mass Dept of Physics
For primary bibliographic entry see Field 20H.
AD-668 216 Not available from CFSTI.

SCHWINGER TERMS FROM LOCAL CURRENTS.
Interim rept.,
Boston Univ Mass Dept of Physics
W. S. Hellman, and P. Roman. 5 Apr 68, 6p
AFOSR-68-0760
Grant AF-AFOSR-385-65
Availability: Published in Il Nuovo Cimento, v52A ser10 p1341-4 21 Dec 67.

Descriptors: (*Decay schemes, Field theory), Algebras, Vector spaces, Operators (Mathematics).
Identifiers: Current algebras, Schwinger term.

It is demonstrated that the appearance of Schwinger terms can be exhibited directly from local currents. An explicit evaluation of the V.E.V. of the product of currents in local form is given. It is also shown that the splitting prescription is not unambiguous and in some forms suffers from loss of Lorentz covariance. The results are not contingent upon the conserved nature of the current. (Author)
AD-668 222 Not available from CFSTI.

AN INVESTIGATION OF THE ANALYTIC PROPERTIES OF SOLUTIONS TO THE GENERALIZED AXIALLY SYMMETRIC, REDUCED WAVE EQUATION IN n + 1 VARIABLES, WITH AN APPLICATION TO THE THEORY OF POTENTIAL SCATTERING.
Indiana Univ Bloomington Dept of Mathematics
For primary bibliographic entry see Field 12A.
AD-668 285 Not available from CFSTI.

COMPLEX ANGULAR MOMENTUM AND INFINITE HELICITY SUMS,
Cambridge Univ (England) Dept of Applied Mathematics and Theoretical Physics
For primary bibliographic entry see Field 20H.
AD-668 313 Not available from CFSTI.

QUANTUM THEORY OF GRAVITY. I. THE CANONICAL THEORY. II. THE MANIFESTLY COVARIANT THEORY. III. APPLICATIONS OF THE COVARIANT THEORY.
Revised ed.,
North Carolina Univ Chapel Hill Dept of Physics
Bryce S. DeWitt. 8 Apr 68, 102p
AFOSR-68-0840
Grant AF-AFOSR-153-64
Revision of report dated 25 Jul 66. Prepared in cooperation with Institute for Advanced Study, Princeton, N. J.
Availability: Published in Physical Review, v160 n5 p1113-48 Aug 25 1967; v162 n5 p1195-256 Oct 25 1967.

Descriptors: (*Gravity, *Field theory), Relativity theory, Quantum mechanics, Wave functions, Invariance, S-matrix, Groups (Mathematics), Green's function, Algorithms.
Identifiers: Graviton cross sections, Evolution (Cosmology).

The article describes recent contributions which have been made to both the canonical and covariant quantum theories of gravity. New results in the canonical theory include an analysis of the structure of the 'space of all 3-geometries,' a definition for the inner product of two state functionals, the quantum theory of the Friedmann universe, an analysis of the fundamental differences between finite and infinite worlds, and an assessment of the meaning of a 'wave function for the universe.' New results in the covariant theory nclude use of a variable background metric, proof of Feynman's tree theorem, decomposition of radiative corrections into 'Feynaman baskets,' use of fictitious quanta to secure a unitary and manifestly covariant S-matrix, an algorithm for dealing with the fictitious quanta in arbitrarily high order, various scattering cross sections, an analysis of the Ward identity and the graviton vertex function, a coordinate-space calculation of vacuum polarization, and a proof of the validity of Weinberg's treatment of the infrared problem. (Author)
AD-668 386
Not available from CFSTI.

SOLUTION OF COUPLED EQUATIONS BY R-MATRIX TECHNIQUES,
Florida State Univ Tallahassee Dept of Physics
For primary bibliographic entry see Field 20H.
AD-668 410 Not available from CFSTI.

A SYSTEMATIC SEARCH FOR NON-RELATIVISTIC SYSTEMS WITH DYNAMICAL SYMMETRIES. PART 1 - THE INTEGRALS OF MOTION.
International Centre for Theoretical Physics, Trieste (Italy).
A. A. Makarov, J. A. Smorodinsky, KH. Valiev, and P. Winternitz. Feb 67, 28p IC/67/8
Subm- Submitted for Publication Spon- Sponsored By Intern. Atomic Energy Agency and Unesco

Descriptors: *Nonrelativistic mechanics, *Quantum mechanics, *Symmetry, Hamiltonian functions, Integral transformations, Invariance, Mathematical models, Operators (mathematics), Schroedinger equation.

For abstract, see STAR 06 10.
N68-20421 HC$3.00 MF$0.65

LOCALIZED STATES AND GROUP CONTRACTION IN 4 PLUS 2 DE SITTER SPACE.
International Centre for Theoretical Physics, Trieste (Italy).
A. Madvemezia. Mar 67, 22p IC/67/13
Subm- Submitted for Publication

Descriptors: *Function space, *Group theory, *Imbeddings (mathematics), Curvature, Eigenvectors, Elementary particles, Operators.

For abstract, see STAR 06 10.
N68-20479 HC$3.00 MF$0.65

20K. Solid Mechanics

INVESTIGATION OF MICROMECHANICAL BEHAVIOR OF FIBER REINFORCED PLASTICS.
Whittaker Corp San Diego Calif Narmco Research and Development Div
For primary bibliographic entry see Field 11D.
AD-667 901 HC$3.00 MF$0.65

SHOCK SPECTRA,
Harry Diamond Labs Washington D C
Paul G. Hershall. Jan 68, 37p Rept no. HDL-TM-67-18

Descriptors: (*Shock (Mechanics), Power spectra), Vibration, Force (Mechanics), Special functions (Mathematical), Equations of motion, Transcendental functions, Integral transforms, Numerical methods and procedures, Impact shock, Computer programs, Digital computers, Analog computers, Modulus of elasticity.
Identifiers: Graphs (Charts).

Numerical solutions in graphical form are presented for the shock spectra of a one-degree-of-freedom system subjected to some idealized forcing functions. Elementary procedures are outlined for developing the solutions. Analog and digital computer programs are submitted where applicable. (Author)
AD-667 935 HC$3.00 MF$0.65

ELASTIC AND MAXIMUM STRENGTH ANALYSES OF POST-BUCKLED RECTANGULAR PLATES BASED UPON MODIFIED VERSIONS OF REISSNER'S VARIATIONAL PRINCIPLE,
Stanford Univ Calif Dept of Aeronautics and Astronautics
For primary bibliographic entry see Field 13M.
AD-667 941 HC$3.00 MF$0.65

SINGLE-WIRE TORSIONAL PENDULUMS AND THEIR USE IN THE MEASUREMENT OF MOMENTS OF INERTIA.
Ballistic Research Labs Aberdeen Proving Ground Md
For primary bibliographic entry see Field 19A.
AD-667 963 HC$3.00 MF$0.65

STRAIN EFFECTS IN DILUTE ALLOYS.
California Univ San Diego La Jolla Dept of Physics
For primary bibliographic entry see Field 11F.
AD-668 023 HC$3.00 MF$0.65

ON THE APPLICATION OF THE 'LAW OF PLANE SECTIONS' TO THE DETERMINATION OF THE AERODYNAMIC FORCES ACTING ON OSCILLATING SHELLS,
Foreign Technology Div Wright-Patterson AFB Ohio
For primary bibliographic entry see Field 20D.
AD-668 031 HC$3.00 MF$0.65

AEROELASTIC STABILITY CHARACTERISTICS OF CYLINDRICAL SHELLS CONSIDERING IMPERFECTIONS AND EDGE CONSTRAINT,
Texas Univ Austin Dept of Aerospace Engineering
For primary bibliographic entry see Field 1C.
AD-668 074 HC$3.00 MF$0.65

APPLIED MECHANICS, VOL. 2, NO. 1 1966. (SELECTED ARTICLES).
Foreign Technology Div Wright-Patterson AFB Ohio
25 Aug 67, 26p Rept no. FTD-HT-66-785
Edited trans. of Prikladnaya Mekhanika (USSR) v2 n1 p53-8, 141-3 1966.

Descriptors: (*Mechanics, USSR), Reports, Abstracts, High-temperature research, Cylindrical bodies, Structural properties, Stresses, Compressive properties, Buckling (Mechanics), Fatigue (Mechanics), Heat-resistant materials, Loading (Mechanics), Turbine parts, Thermal stresses, Ceramic materials, Axial-flow compressors, Symposia.
Identifiers: Translations.

Contents: The effect of initial buckling on the stability of finned cylindrical shells under axial compression: and Conference on problems of high-temperature strength.
AD-668 117 HC$3.00 MF$0.65

AN ANALYSIS OF THE SPLIT HOPKINSON PRESSURE BAR,
Naval Ordnance Lab White Oak Md
James L. Rand. 2 Oct 67, 81p Rept no. NOLTR-67-156

Descriptors: (*Strain gages, Performance (Engineering)), Strain (Mechanics), Stresses, Pressure, Mathematical analysis, Mechanical waves, Propagation, Friction, Test methods, Aluminum, Modulus of elasticity.
Identifiers: Hopkinson pressure bars.

The purpose of the paper is to analyze in detail many of the assumptions and techniques often employed to obtain stress-strain relations at rates of strain of approximately 1000/sec. The effects of axial wave propagation and interaction detail in short cylindrical specimens on the resulting stress-strain relation were evaluated in detail. The effect of specimen geometry on the 'end effects' associated with friction was demonstrated both theoretically and experimentally. (Author)
AD-668 166 HC$3.00 MF$0.65

A DYNAMIC VIBRATION ABSORBER FOR TRANSIENTS.
Naval Ordnance Lab White Oak Md
Dirse W. Sallet. 3 Mar 68, 32p Rept no. NOLTR-67-60

Descriptors: (*Vibration isolators, Equations of motion), Vibration, Shock absorbers, Damping, Dynamics, Transfer functions, Resonance.

The principle of the dynamic vibration absorber was applied to reduce in a defined manner transient vibrations of a one degree of freedom system. Ten rules were developed which relate the position of the roots of the characteristic equation to the physical parameters. The concept of the 'relative' and the 'absolute influence position' is introduced: these new definitions refer to a particular position of the roots of the characteristic equation when only the spring constant, or, respectively, the spring constant and the damping coefficient between the masses are variable. (Author)
AD-668 168 HC$3.00 MF$0.65

ADSORPTION-SENSITIVE MECHANICAL BEHAVIOR.
Technical rept.,
Martin Marietta Corp Baltimore Md Research Inst for Advanced Studies
Albert R. C. Westwood, Carolyn M. Preece, and David L. Goldheim. Mar 68, 35p Rept no. RIAS-TR-68-6c
Contract Nonr-4162 (00)

Descriptors: (*Embrittlement, *Adsorption), (*Liquid metals, Mechanical properties), (*Crystals, Mechanical properties), Silver compounds, Chlorides, Chemisorption, Cracks, Complex compounds, Dislocations, Carriers (Semiconductors), Magnesium oxides, Lithium fluorides, Calcium fluorides, Hardness.
Identifiers: Rebinder effects.

It has been suggested that certain types of adsorption-sensitive mechanical behavior may be understood, in a general way, by considering the type, concentration, mobility and adsorption-induced redistribution of the charge carriers in the solid. Some recent experimental observations on the embrittlement of AgCl, and Rebinder effects (adsorption-induced reductions in microhardness) in ionic crystals are described and discussed in terms of this hypothesis. (Author)
AD-668 172 HC$3.00 MF$0.65

DAMPING IN DEFORMED IRON CONTAINING INTERSTITIAL IMPURITIES.
Columbia Univ New York Henry Krumb School of Mines
For primary bibliographic entry see Field 11F.
AD-668 173 HC$3.00 MF$0.65

FILTERING CHARACTERISTICS OF A LONG CYLINDRICAL STEEL BAR WITH DISCONTINUITIES IN ITS CROSS-SECTIONAL AREA.
Technical rept.,
Houston Univ Tex Dept of Mechanical Engineering
J. D. Bruner, and D. Muster. Oct 67, 27p Rept no. TR-8
Contract Nonr-4492 (01)

Descriptors: (*Rods, Attenuation), (*Pipes, Vibration), Cylindrical bodies, Mechanical waves, Models (Simulations), Numerical analysis, Equations of motion, Analog systems, Acoustic impedance, Propagation.
Identifiers: Drill pipes, Equivalent circuits.

In terms of a mechanical-electrical analogy, a four-terminal electrical network is synthesized which has the characteristics of string of drill pipe subjected to longitudinal vibrations. Electrically, it is a Pi-section band-pass filter composed of passive, non-dissipative components which take their properties from the physical characteristics of the mechanical system, including the distance between discontinuities and the area ratios at the discontinuities. The attenuation characteristics of a typical drill string model are given as a function of frequency. The pass- and stop-bands for the system are discussed. (Author)
AD-668 175 HC$3.00 MF$0.65

SOME ASPECTS OF CYLINDRICAL SHELL PANEL FLUTTER.
Texas Univ Austin Dept of Aerospace Engineering
For primary bibliographic entry see Field 20D.
AD-668 218 Not available from CFSTI.

VIBROMETRY.
Foreign Technology Div Wright-Patterson AFB Ohio
Yu. I. Iorish. 7 Jul 67, 891p Rept no. FTD-MT-65-217
Edited machine trans. of mono. Vibrometriya, 2d ed., Moscow, 1962 772p.

Descriptors: (*Vibration, USSR), Textbooks, Measurement, Oscillation, Periodic variations, Harmonic analysis, Vector analysis, Equations of motion, Fourier analysis, Integral transforms, Shock (Mechanics), Linear systems, Circuits, Rods, Nonlinear systems, Test equipment, Gyroscopes, Electrical equipment, Optical equipment, Electronic equipment, Calibration, Test methods, Analysis.
Identifiers: Translations, Forced oscillations, *Vibrometry.

This book considers the measurement of vibrations and shocks in machines and equipment. It includes sections on vibrations which must be known to understand the physical processes that take place in vibration measuring equipment. The general theory of vibration measuring equipment, a description of the equipment and its elements, particularly mechanical vibration gauges, methods of testing and calibrating equipment, recommendations for the organization of the measurements, and methods of analyzing the vibrograms are given in the book. The book is intended for researchers and engineers who study mechanical vibrations in the various branches of technology and for designers of measuring equipment. The book can also be an aid to students in mechanical and polytechnic higher education institutions. The chapters directly relating to the technique of measuring vibrations can be used by middle technical personnel.
AD-668 226 HC$3.00 MF$0.65

STUDY OF MICROMECHANICAL PROPERTIES OF ADHESIVE BONDED JOINTS.
General Precision Systems Inc Little Falls N J Aerospace Research Center
For primary bibliographic entry see Field 13E.
AD-668 245 HC$3.00 MF$0.65

THE SHOCK AND VIBRATION BULLETIN.
Shock and Vibration Information Center (Defense) Washington D C
Jan 68, 184p
NRL-Bull-37-Pt-5
Symposium on Shock and Vibration (37th), Orlando, Fla., 24-6 Oct 67. See also NRL-Bull-37-Pt-4, AD-667 229.

Descriptors: (*Shock (Mechanics), Symposia), (*Vibration, Symposia), Impact shock, Fluid dynamic properties, Spacecraft, Cratering, Physical properties, Transducers, Nuclear explosion damage, Stresses, Elasticity, Attenuation, X-ray absorption analysis, Acoustic properties, Shear stresses, Viscosity, Acceleration, Mathematical analysis, Simulation, Helicopters.

Contents: Vibroacoustic environmental simulation for aerospace vehicles; RTD sonic fatigue facility, design and performance characteristics; Operational characteristics of a 100,000-cubic-foot acoustic reverberation chamber; Concept, design, and performance of the spacecraft acoustic laboratory; Theoretical study of acoustic simulation of in-flight environments; Data handling methods for large vehicle testing; Development and verification of the vibration test requirements for the Apollo command and service modules; Development and verification of the Apollo lunar module vibration test requirements; Saturn S-II, S-IVB, and instrument unit subassembly and assembly vibration and acoustic evaluation programs; Development of acoustic test conditions for Apollo lunar module flight certification; Facility sonic fatigue proof testing; Vibroacoustic test methods for vibration qualification of Apollo flight hardware; Acoustical qualification of S-IC fin structures; Simulation of acoustic fatigue failure in the wideband noise test facility of the Air Force Flight Dynamics Laboratory; Real-time combined acoustic-vacuum testing of spacecraft.
AD-668 246 HC$3.00 MF$0.65

THE POTENTIAL USE OF MATHEMATICAL MODELS IN MATERIALS DATA PRESENTATION WITH PARTICULAR REFERENCE TO THE AGARD MATERIAL PROPERTIES HANDBOOKS.
Advisory Group for Aerospace Research and Development Paris (France)
For primary bibliographic entry see Field 14B.
AD-668 254 HC$3.00 MF$0.65

THE SHOCK AND VIBRATION BULLETIN, PART VI.
Shock and Vibration Information Center (Defense) Washington D C
Jan 68, 86p
NRL-Bull-37-Pt-6
See also Part 7, AD-667 230.

Descriptors: (*Shock (Mechanics), Symposia), (*Vibration, Symposia), Impact shock, Fluid dynamic properties, Predictions, Cratering, Physical properties, Lasers, Shock resistance, Accelerometers, Elasticity, Noise, Acoustic properties, Helicopters, Shear stresses, Spacecraft, Viscosity, Mathematical analysis.

Contents: Helicopter vibrations; Helicopter vibration; In-flight vibration and acoustic study on the uh-1F helicopter; Helicopter fuselage vibration prediction by stiffness mobility methods; Isolation of helicopter rotor-induced vibrations using active elements; Hybrid vibration-isolation system for helicopters; Recent advances in the study of synchronous vibration absorbers; Optimizing the dynamic absorber to increase system damping; Application of the dynamic antiresonant vibration isolator to helicopter vibration control.
AD-668 328 HC$3.00 MF$0.65

CALCULATION OF THE LOAD CARRYING CAPACITY OF INITIALLY SLIGHTLY IMPERFECT THIN WALLED CIRCULAR CYLINDRICAL SHELLS OF FINITE LENGTH.
Stanford Univ Calif Dept of Aeronautics and Astronautics
For primary bibliographic entry see Field 13M.
AD-668 450 HC$3.00 MF$0.65

INSTRUMENTATION FOR SOIL MOTION STUDIES.
Air Force Special Weapons Center Kirtland AFB N Mex
For primary bibliographic entry see Field 18C.
AD-668 451 HC$3.00 MF$0.65

DYNAMICS OF RECTANGULAR PLATES.
State Univ of New York Buffalo Div of Interdisciplinary Studies and Research
Yu-Chung Lee, and Herbert Reismann. Mar 68, 45p Rept no. 30
AFOSR-68-0577
Grant AF-AFOSR-988-67

Descriptors: (*Structural parts, Elasticity), Dynamics, Rectangular bodies, Loading (Mechanics), Load distribution, Stresses, Equations of motion.
Identifiers: *Plates (Mechanical).

The dynamic response of a simply supported rectangular plate is treated within the framework of classical, three-dimensional elasticity theory. The plate is subjected to a suddenly applied, uniformly distributed transverse load over a rectangular area, the sides of which are parallel and perpendicular to the sides of the plate. An exact solution in series form is given, and a comparison of this solution with previously obtained corresponding solutions within the framework of classical and improved plate theories is also presented. (Author)
AD-668 459 HC$3.00 MF$0.65

THE STRESS INTENSITY FACTORS FOR A GRIFFITH CRACK IN AN ELASTIC BODY IN WHICH THERE IS AN ASYMMETRICAL DISTRIBUTION OF BODY FORCES.
Interim rept.,
North Carolina State Univ Raleigh Applied Mathematics Research Group
Ian N. Sneddon, and J. Tweed. 2 Apr 68, 53p
AFOSR-68-0852
Grant AF-AFOSR-444-66

Descriptors: (*Cracks, *Stresses), Load distribution, Intensity, Elasticity, Force (Mechanics), Boundary value problems, Integral equations, Functional analysis.
Identifiers: Griffith cracks.

The paper deals with the problem of determining the distribution of stress in the vicinity of a Griffith crack in a solid when body forces are acting in the solid. The work considers the solution of this problem when body forces are not distributed symmetrically with respect to the faces of the crack. (Author)
AD-668 461 HC$3.00 MF$0.65

THE STRESS INTENSITY FACTORS FOR A GRIFFITH CRACK WHOSE SURFACES ARE LOADED ASYMMETRICALLY.
North Carolina State Univ Raleigh Applied Mathematics Research Group
I. N. Sneddon, and B. C. O. Ejike. Apr 68, 23p
AFOSR-68-0853
Grant AF-AFOSR-444-66

Descriptors: (*Cracks, *Stresses), Surface properties, Intensity, Loading (Mechanics), Integral equations, Geometric forms.
Identifiers: Griffith cracks.

Formulae for the calculation of the stress intensity factors at the tip of a Griffith crack and for the normal component of the surface displacement are derived for a crack whose surfaces are subjected to completely arbitrary surface tractions. (Author)
AD-668 462 HC$3.00 MF$0.65

APPLICATION OF THE PLATE TWIST TEST TO LAMINATED COMPOSITES.
Air Force Materials Lab Wright-Patterson AFB Ohio
For primary bibliographic entry see Field 11D.
AD-668 477 HC$3.00 MF$0.65

DYNAMIC PROPERTIES OF SMALL, CLEAR SPECIMENS OF STRUCTURAL-GRADE TIMBER.
Naval Civil Engineering Lab Port Hueneme Calif
For primary bibliographic entry see Field 11L.
AD-668 487 HC$3.00 MF$0.65

NOTE ON FATIGUE MECHANISM IN fcc METALS AT ULTRASONIC FREQUENCIES.
Columbia Univ New York Dept of Civil Engineering and Engineering Mechanics
For primary bibliographic entry see Field 11F.
AD-668 499 HC$3.00 MF$0.65

ELASTIC MODULI AND ULTRASOUND VELOCITIES OF TUNGSTEN AS A FUNCTION OF TEMPERATURE.
Argonne National Lab., Ill.
For primary bibliographic entry see Field 11F.
For abstract, see NSA 22 08.
ANL-7272 HC$3.00 MF$0.65

ELAS - A GENERAL PURPOSE COMPUTER PROGRAM FOR THE EQUILIBRIUM PROBLEMS OF LINEAR STRUCTURES. VOLUME 1 - USER'S MANUAL.
Jet Propulsion Lab., Calif. Inst. of Tech., Pasadena.
F. A. Akyuz, and S. Utku. 1 Feb 68, 81p NASA-CR-93675, JPL-TR-32-1240
Contract NAS7-100

Descriptors: *Computer programming, *Data processing, *Digital computers, *Manuals, *Structural analysis, Data retrieval, Documents, Error detection codes, Fortran, Input, Mathematical models, Matrices (mathematics), Output, Punched cards, Punched tapes, Registers (computers).

For abstract, see STAR 06 10.
N68-19515 HC$3.00 MF$0.65

STUDY OF APOLLO WATER IMPACT. VOLUME 7 - MODIFICATION OF SHELL OF REVOLUTION ANALYSIS FINAL REPORT.
North American Aviation, Inc., Downey, Calif. Space Div.
A. P. Cappelli, and S. C. Furuike. May 67, 35p NASA-CR-92023, SID-67-498, V. 7
Contract NAS9-4552

Descriptors: *Elastic shells, *Hydrodynamic equations, *Numerical analysis, *Shell theory, Hydroelasticity, Mathematical models, Partial differential equations, Pressure distribution.

For abstract, see STAR 06 10.
N68-19699 HC$3.00 MF$0.65

STUDY OF APOLLO WATER IMPACT. VOLUME 2 - DYNAMIC RESPONSE OF SHELLS OF REVOLUTION DURING VERTICAL IMPACT INTO WATER - NO INTERACTION FINAL REPORT.
North American Aviation, Inc., El Segundo, Calif. Space Div.
A. P. Cappelli, and J. P. Wilkinson. May 67, 58p NASA-CR-92020, SID-67-498, V. 2
Contract NAS9-4552

Descriptors: *Dynamic response, *Elastic shells, *Impact loads, *Mathematical models, *Water landing, Bodies of revolution, Pressure distribution, Reentry vehicles.

For abstract, see STAR 06 10.
N68-19761 HC$3.00 MF$0.65

HYPERVELOCITY IMPACT DAMAGE IN ALUMINUM TARGETS FINAL REPORT.
Douglas Aircraft Co., Inc., Santa Monica, Calif. Missile and Space Systems Div.
R. N. Teng. Mar 68, 64p NASA-CR-92016, DAC-59816
Contract NAS9-7452
Rean- Revised

Descriptors: *Aluminum, *Hypervelocity impact, *Meteoritic damage, *Performance tests, *Terminal ballistics, Environment simulation, Meteoroid protection, Spacecraft shielding, Target thickness.

For abstract, see STAR 06 10.
N68-19768 HC$3.00 MF$0.65

DESIGN, FABRICATION AND TESTING OF SUBSCALE PROPELLANT TANKS WITH CAPILLARY TRAPS FINAL REPORT, 26 JUN. 1967 - 15 MAR. 1968.
Martin Co., Denver, Colo.
T. R. Barksdale, and H. L. Paynter. Mar 68, 50p NASA-CR-61676, MCR-68-11
Contract NAS8-20837

Descriptors: *Gravitational effects, *Hydrostatics, *Interface stability, *Perforated plates, Capillary flow, Fuel tank pressurization, Liquid-gas mixtures, Liquid-vapor interfaces, Screens, Ullage.

For abstract, see STAR 06 10.
N68-19836 HC$3.00 MF$0.65

STUDY OF APOLLO WATER IMPACT. VOLUME 8 - UNSYMMETRIC SHELLS OF REVOLUTION ANALYSIS FINAL REPORT.
North American Aviation, Inc., El Segundo, Calif. Space Div.
A. P. Cappelli, T. Nishimoto, K. E. Pauley, and P. P. Radkowski. May 67, 78p NASA-CR-92024, SID-67-498, V. 8
Contract NAS9-4552

Descriptors: *Computerized simulation, *Dynamic response, *Numerical analysis, *Shell theory, *Water landing, Apollo project, Fourier analysis, Impact loads, Matrix methods, Static stability, Structural stability.

For abstract, see STAR 06 10.
N68-19867 HC$3.00 MF$0.65

STUDY OF APOLLO WATER IMPACT. VOLUME 4 - COMPARISON WITH EXPERIMENTS FINAL REPORT.
North American Aviation, Inc., El Segundo, Calif. Space Div.
J. P. Wilkinson. May 67, 80p NASA-CR-92022, SID-67-498, V. 4
Contract NAS9-4552

Descriptors: *Apollo project, *Impact loads, *Impact tests, *Numerical analysis, *Scale models, *Water landing, Angular acceleration, Pressure effects, Tables (data), Velocity.

For abstract, see STAR 06 10.
N68-19994 HC$3.00

TEDDY - A TWO-DIMENSIONAL LAGRANGIAN CODE FOR DETERMINING THE WAVE PROPAGATION IN ELASTIC-PLASTIC MEDIA.
General Motors Corp., Santa Barbara, Calif.
A. H. Jones, and C. E. Kriech. Dec 66, 190p NASA-CR-92034, TR66-85
Contract NAS9-3081

Descriptors: *Computer programming, *Elastoplasticity, *Finite difference theory, *Lagrange coordinates, *Wave propagation, Compressibility, Equations of motion, Equations of state, Flow charts, Mesh.

For abstract, see STAR 06 10.
N68-20013 HC$3.00 MF$0.65

STUDY OF APOLLO WATER IMPACT. VOLUME 9 - MODE SHAPES AND NATURAL FREQUENCIES ANALYSIS FINAL REPORT.
North American Aviation, Inc., El Segundo, Calif. Space Div.
A. P. Cappelli, May 67, 35p NASA-CR-92025, SID-67-498, V. 9
Contract NAS9-4552

Descriptors: *Apollo project, *Impact loads, *Numerical analysis, *Vibrational spectra, *Water landing, Free vibration, Frequencies, Shell theory, Vibration mode.

For abstract, see STAR 06 10.
N68-20069 HC$3.00 MF$0.65

STUDY OF APOLLO WATER IMPACT. VOLUME 3 - DYNAMIC RESPONSE OF SHELLS OF REVOLUTION DURING VERTICAL IMPACT INTO WATER - HYDROELASTIC INTERACTION FINAL REPORT.
North American Aviation, Inc., El Segundo, Calif. Space Div.
A. P. Capelli, R. N. Salzman, and J. P. Wilkinson. May 67, 65p NASA-CR-92021, SID-67-498, V. 3
Contract NAS9-4552

Descriptors: *Hydroelasticity, *Impact loads, *Spacecraft landing, *Spherical shells, *Water landing, Apollo project, Modulus of elasticity, Numerical analysis.

For abstract, see STAR 06 10.
N68-20108 HC$3.00 MF$0.65

VIBRATIONAL CHARACTERISTICS OF ORTHOTROPIC SHELLS OF REVOLUTION SUMMARY REPORT.
Lockheed Missiles and Space Co., Huntsville, Ala.
C. E. Jones, K. R. Leimbach, and W. D. Whetstone. Mar 68, 73p NASA-CR-61692, HREC-1095-1
Contract NAS8-21095

Descriptors: *Computer programs, *Energy methods, *Iterative solution, *Orthotropic shells, *Vibration mode, Bodies of revolution, Computer programming, Costs, Linear systems, Loads (forces), Resonant frequencies, Stress analysis.

For abstract, see STAR 06 10.
N68-20286 HC$3.00 MF$0.65

VIBRATIONAL CHARACTERISTICS OF LINEAR SPACE FRAMES.
Lockheed Missiles and Space Co., Huntsville, Ala.
C. E. Jones, and W. D. Whetstone. Mar 68, 63p NASA-CR-61691, HREC-1095-1
Contract NAS8-21095

Descriptors: *Computer programs, *Frames, *Linear systems, Beams (supports), Energy methods, Matrices (mathematics), Rectangular beams, Resonant frequencies, Spacecraft design, Stress analysis, Structural analysis, Vibration mode.

For abstract, see STAR 06 10.
N68-20309 HC$3.00 MF$0.65

ONE-DIMENSIONAL WAVE MOTION IN PRISMATIC BARS DUE TO IMPULSE LOADS WITH AND WITHOUT COULOMB DAMPING.
National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
D. D. Tomlin, Jr., 1 Mar 68, 100p NASA-TM-X-53714

Descriptors: *Friction, *Rods, *Structural vibration, *Wave propagation, Coulomb potential, Elastic damping, Equations of motion, Laplace transformation, Linear vibration, Mechanical impedance, One dimensional flow, Vibration mode.

For abstract, see STAR 06 10.
N68-20359 HC$3.00 MF$0.65

SPECTRUM INDEX LU- DY MICRODISTRIBUTION MEASUREMENTS IN "ANNA" REACTOR LATTICES.
Polish Academy of Sciences, Warsaw. Inst. of Nuclear Research.
L. Adamski, E. T. Jozefowicz, and K. Jozefowicz. 1967, 12p REPT.-821/9A/PR

Descriptors: *Lattice parameters, *Neutron thermalization, *Nuclear fuel elements, *Reactor technology, Energy spectra, Graphite, Irradiation, Neutron cross sections, Nuclear reactors, Water

For abstract, see STAR 06 10.
N68-20435 HC$3.00

INTERNAL STRESSES IN MEDIA WITH MICROSTRUCTURE,
Lockheed Missiles and Space Co., Palo Alto, Calif.
I. A. Kunin. 1967, 13p
Trans. of Prikadnaya Matematika i Mekhanika (USSR) v31 n5 p889-96 1967.

Descriptors: (*Crystals, *Stresses), Microstructure, Dislocations, Deformation, Tensor analysis, Modulus of elasticity, Crystal lattice defects.

A general analysis is given of the statics of internal stresses in a medium with microstructure. The state of the medium is described by internal and external distortions, where the former is governed by the condition of orthogonality, with respect to the energy, of the external distortion tensor. The structure of the operator of the elastic moduli of the internal stresses is analyzed. It is shown that it generally differs from the operator of the elastic moduli of the external stresses by some operator which is localized in a domain where internal stress sources are concentrated. The Green's tensor for the internal stresses is determined, and its connection with the Green's tensor for the external stresses is established. Expressions are written down for the elastic energy and the stress fields of dislocations and ofpoint defects in terms of the Green's tensor. An explicit expression for the Green's tensor of internal stresses in an isotropic medium with spatial dispersion is constructed. The asymptotic of the Green's tensor is analyzed, and in particular, the contribution to the asymptotic from the nonlinear dependence of the dispersion curve on the wave vector is determined. (Author)
PB-176 876T HC$3.00 MF$0.65

SNAPPING OF A CYLINDRICAL PANEL SUBJECTED TO AN ACOUSTIC PRESSURE SHOCKWAVE,
Lockheed Missiles and Space Co., Palo Alto, Calif.
E. I. Grigolyuk, A. G. Gorshkov, and F. N. Shklyarchuk. 9 Dec 66, 8p
Trans. of Mekhanika Tverdogo Tela (USSR) n5 p50-5 1967.

Descriptors: (*Panels (Structural), Failure (Mechanics)), Shock waves, Acoustic properties, Pressure, Cylindrical bodies, Loading (Mechanics), Deformation, Elasticity, Approximation (Mathematics), Deflection, Equations of motion, Stresses, Hydrodynamics, USSR.
Identifiers: Snapping (Mechanics).

The behavior of a thin elastic circular cylindrical hinge-supported panel, fixed in a rigid cylindrical screen and subjected to an acoustic shock whose front is parallel to the panel generatrix is studied. The transverse panel motions are described by the known equations of finite deflection from thin shallow shell theory. Two kinds of approximations were made in the analytical solution, an approximation to the shape of the moving panel, and an approximation of the pressure from the acoustic wave field. (Author)
PB-177 581T HC$3.00 MF$0.65

ON SOME PROPERTIES OF THE STRESS STATE OF A THIN ELASTIC LAYER,
Lockheed Missile and Space Co., Palo Alto, Calif.
M. I. Gusein-Zade. 27 Jun 67, 13p
Trans. of Prikladnaya Matematika i Mekhanika (USSR) v31 n6 p1132-40 1967.

Descriptors: (*Structural parts, *Stresses), Elasticity, Thickness, Integration, Loading (Mechanics), Surfaces, Differential equations, USSR.
Identifiers: Plates (Mechanical).

An investigation of the internal stress state of thin layer was conducted by the method of asymptotic integration of the Lame equations, whereupon no assumptions were made on the order of the surface loading, and it is just considered that the displacements in the plane of the layer is an order less than the displacements out of its plane. This allows a general asymptotic solution of the equations of elasticity theory to be obtained for the internal stress state, and in a form suitable to describe the behavior of a homogeneous plate subjected to arbitrary surface loading, as well as the behavior of a layer compressed by stiffer layers (weak layers in multilayer plates). (Author)
PB-177 582T HC$3.00 MF$0.65

ON THE ANALYSIS OF LINE-LOADED CYLINDRICAL SHELLS,
Lockheed Missiles and Space Co., Palo Alto, Calif.
E. I. Grigolyuk, and V. M. Tolkachev. 23 Mar 67, 9p
Prikladnaya Matematika i Mekhanika (USSR) v31 n6 p1141-6 1967.

Descriptors: (*Structural shells, Loading (Mechanics)), Cylindrical bodies, Green's function, Force (Mechanics), Mathematical analysis, Stresses, USSR.

In considering a closed circular cylindrical shell loaded along an arbitrary line of the middle surface, the method of computation is based on using the Green's function, the solution due to a concentrated force. Hence, a particular integral is constructed which corresponds to the solution of the problem for an infinite shell. The boundary conditions on the endfaces may be satisfied by adding on the solution of the homogeneous equations. (Author)
PB-177 583T HC$3.00 MF$0.65

20L. Solid-State Physics

RADIATION-INDUCED DEFECTS IN SEMICONDUCTORS: A MEASUREMENT TECHNIQUE AND APPLICATIONS TO GAMMA-IRRADIATED SILICON,
Stanford Univ Calif
D. Landis, and G. L. Pearson. 1967, 10p
AROD-2895:22-E
Contract DA-31-124-ARO (D)-155
Research supported in part by Lockheed Missiles and Space Co., Palo Alto, Calif.
Availability: Published in Radiation Effects in Semiconductors, p301-7 1968.

Descriptors: (*Semiconductors, *Radiation damage), Crystal lattice defects, Carriers (Semiconductors), Atomic energy levels, Gamma rays, Silicon, Measurement, Oxygen.

A technique is developed that determines with high precision the energy levels and introduction rates of radiation-induced defects in semiconductors. The technique uses constant temperature measurements of carrier concentration versus radiation fluence. Applications to irradiations of oxygen-containing silicon by Co-60 are given. (Author)
AD-667 893 Not available from CFSTI.

OSCILLATOR STRENGTHS OF F AND M CENTERS IN POTASSIUM CHLORIDE,
Frankford Arsenal Philadelphia Pa Pitman-Dunn Research Labs
Michael A. Shields. Mar 68, 19p
FA-M68-21-1

Descriptors: (*Potassium compounds, Color centers), (*Color centers, Absorption spectrum), Chlorides, Electron transitions, Probability, Crystal lattices, pH.
Identifiers: Potassium chloride.

The optical absorption coefficients and the half-widths of the F and M bands were measured at room temperature in additively colored KCl in which the relative proportions of the color centers were varied by room temperature F-light irradiation. Care was taken to reduce the concentrations of higher aggregate centers by suitable annealing. In interpreting the results, the F center was considered to be a negative ion vacancy with an associated electron and the M center, a pair of F centers in nearest neighbor <110> positions. The slope of the alpha-F vs. alpha-M curve yielded an average value of the ratio of the M- and F-center oscillator strengths, fM/fF = 0.43, in agreement with other measurements. The oscillator strength is the probability of occurrence of the color center optical transition responsible for the absorption peak. An attempt to obtain an absolute value of the F-center oscillator strength by comparing pH and optical measurements is described. (Author)
AD-667 972 HC$3.00 MF$0.65

THE THEORY OF MOBILITY, HALL EFFECT AND MAGNETORESISTANCE IN SEMICONDUCTORS WITH NON-UNIFORM CONCENTRATION OF CHARGED IONS.
APL Library bulletin translation series.
Johns Hopkins Univ Silver Spring Md Applied Physics Lab
Yu. V. Kornyushin. 30 Jan 68, 10p Rept no. APL-TG-230-T543
Contract NOw-62-0604
Trans. of Ukrayinskyi Fizychnyi Zhurnal (USSR) v12 n8 p1327-30 1967, tr. by L. J. Holtschlag.

Descriptors: (*Carriers (Semiconductors), Mobility), Semiconductors, Ions, Anisotropy, Hall effect, Magnetic properties, Electrostatic fields, Impurities, Tensor analysis, Crystal lattices, Vibration, Scattering, USSR.
Identifiers: Translations, Magnetoresistance.

The theory of kinetic phenomena in semiconductors with charged ions is generalized to the case of non-uniform ion concentration. The free-path length of current carriers with respect to thermal vibrations and other scattering mechanisms, excluding charged-ion scattering, is assumed to be much smaller than the Debye screening radius in a semiconductor. The non-uniform charged ion concentration in the general case makes an anisotropic contribution to tensors describing kinetic phenomena in semiconductors. This effect may be considerably greater in value than the effect obtained for the case of non-uniform charged-ion concentration in semiconductors. (Author)
AD-668 014 HC$3.00 MF$0.65

RELAXATION OF LOCAL PERTURBATION IN A QUANTUM VIBRATIONAL SYSTEM,
Foreign Technology Div Wright-Patterson AFB Ohio
A. P. Purga. 16 Aug 67, 19p Rept no. FTD-MT-24-92-67
Edited machine trans. of Akademiya Nauk Estonskoi SSR, Tallinn. Institut Fiziki i Astronomii. Trudy, n27 p57-68 1964.

Descriptors: (*Crystal lattice defects, Relaxation time), Atomic energy levels, Excitation, Electron transitions, Luminescence, Quantum mechanics, Vibration, USSR.
Identifiers: Translations.

Relaxation of local perturbation in a quantum vibrational system in harmonic approximation is examined. The relaxation of oscillatory energy in an electron-vibrational transition in the impurity center of a crystal is an example of processes of such type. General formulae describing the relaxation of state and energy, localized in the region of perturbation are obtained. In the case of a monatomic chain with isotopic defect calculations of laws of relaxation are reduced to numerical values and presented in the form of graphs. Laws of disintegration have a complex oscillatory form. The result of calculation of relaxation of mean oscillatory energy of impurity atom for the examined model will agree with results of the work of Zavt, where an analogous problem is solved by the methods of classical mechanics. (Author)
AD-668 016 HC$3.00 MF$0.65

ACTION D'UN CHAMP MAGNETIQUE DE FAIBLE INTENSITE SUR LES ECHOS DE SPINS ELECTRONIQUES (Action of a Magnetic Field of Weak Intensity on the Echoes of Electron Spins),
Mcgill Univ Montreal (Quebec) Eaton Electronics Research Lab
M. Dupont, and G. A. Woonton. 1968, 16p
Text in French.
Availability: Published in Canadian Journal of Physics, v46 p87-102 1968.

Descriptors: (*Electron spin resonance, Magnetic fields), (*Crystal lattice defects, Electron spin resonance), Quantum mechanics, Chromium, Cerium, Ions, Calcium compounds, Tungstates, Potassium compounds, Cobalt compounds, Cyanides, Canada.
Identifiers: *Echo phenomena (Quantum mechanical), *Electron spin echoes, Calcium tungstate, Potassium hexacyanocobaltate.

Certain experiments orginally performed by Srivastava (Phys. Canada v22 p29 1966, and elsewhere), concerning the effects of magnetic fields on electron spin echoes, were repeated with modified experimental conditions. In particular, the coils were placed outside the resonator cavity. The results obtained generally confirmed those of Srivastava and permitted an explanation of the observed phenomena.
AD-668 025 Not available from CFSTI.

THEORY OF NONLINEAR OPTICAL PHENOMENA IN EXTRINSIC SEMICONDUCTORS,
Foreign Technology Div Wright-Patterson AFB Ohio
V. I. Ponomarenko. 18 Aug 67, 34p Rept no. FTD-MT-24-178-67
Edited machine trans. of mono. Kvantovaya Elektronika, Kiev, 1966 p13-33, also pub. as Trudy Respublikanskogo Seminara po Kvantovoi Elektronike.

Descriptors: (*Semiconductors, Band theory of solids), (*Coherent radiation, Interactions), (*Lasers, Theory), Hamiltonian, Excitation, Impurities, Brillouin zones, Crystal lattices, Electrons, Absorption spectrum, USSR.
Identifiers: Translations, Nonlinear optics, Quantum electronics.

The two-photon absorption and the second-harmonic generation in extrinsic n- and p-type semiconductors are theoretically considered. States of electrons are described within the framework of the band theory of solid body; the interaction between radiation and solid-body electrons is examined (R. Braunstein, Phys. Rev., 1961, 125, 475; R. Loudon, Proc. Phys. Soc., 1962, 80, 952). It is found that the absorption factor of w1 photons is proportional to the intensity of the second beam of w2 -frequency photons. Maximum 2-photon absorption is possible when one of the frequencies is low and the other is close to the frequency that corresponds to the fringe of self-absorption; the effect of 2-photon absorption is stronger in those crystals in which the virtual band lies close to the conduction band. The effect of impurities on the 2-photon absorption (donor and acceptor centers, high and low temperatures, concentration of impurities) is investigated. Generation of the second harmonic is first considered in intrinsic semiconductors (here, the band-structure effect is explored) and then the effect of impurities is evaluated.
AD-668 049 HC$3.00 MF$0.65

HYDROGEN DOPING AND PARAMAGNETIC PROPERTIES OF IONIC CRYSTALS AT HIGH TEMPERATURES,
Rome Air Development Center Griffiss AFB N Y
Raymond A. Serway, and Reagen Zogby. Mar 68, 38p Rept no. RADC-TR-68-4

Descriptors: (*Alkaline earth compounds, Magnetic properties), (*Crystal structure, Spectroscopy), Paramagnetic materials, Single crystals, Electron spin resonance, Hyperfine structure, Doping, Fluorides, Hydrogen, Band theory of solids, Lasers, Masers, Phonons, High-temperature research, Microwave frequency.
Identifiers: Ionic crystals, Quantum electronics, Spin echoes, Debye temperature.

This report describes the results of a two-phase solid state research program. The first phase was an effort to dope single crystals of the alkaline earth fluorides with hydrogen by diffusion techniques at high temperatures. The techniques used to successfully dope calcium fluoride with hydrogen and the difficulties encountered with cadmium fluoride are described. The second phase of the program was concerned with the measurement of the paramagnetic properties of several ionic crystals as a function of temperature. A possible potential result could be the design of a maser whose operating frequency can be tuned by varying the bath temperature. A high temperature 3 cm wavelength resonant cavity was designed and built, capable of operation up to about 850 degrees K. Electron spin resonance (ESR) data was taken on divalent manganese ions substitutional in calcium carbonate, calcium fluoride, and barium fluoride host lattices. For the case of manganese-doped calcium carbonate, a definite temperature dependence was measured for the hyperfine structure-splitting parameter. In addition, the crystal field-splitting energies were found to be temperature dependent. The temperature dependence of the hyperfine structure splitting was also measured for divalent manganese in CaF2 and BaF2. A discussion of these results in view of recent theoretical treatments is presented. (Author)
AD-668 122 HC$3.00 MF$0.65

COUPLED-MODE INSTABILITIES IN VELOCITY-SATURATED SEMICONDUCTORS,
Norges Tekniske Hoegskole Trondheim Div of Physical Electronics
Tore Wessel-Berg. Jan 68, 76p Rept nos. Scientific-4, AE-5
RADC-TR-68-161
Contract AF 61 (052)-907

Descriptors: (*Semiconductors, Transport properties), Carriers (Semiconductors), Doping, Electric currents, Electric terminals, Interfaces, Microwave frequency, Germanium, Mobility, Stability, Models (Simulations), Norway.
Identifiers: Carrier-mode excitations, Coupled-mode instabilities.

Field and transport equations are formulated in terms of a particular set of variables which lends itself to a coupled-mode description of semiconductors with carrier drift. The theory is applied to a one-dimensional sample with velocity saturation such as germanium, in which case the electromagnetic as well as the carrier mode are undamped and lossless. Calculations performed at microwave frequencies show that the carrier-mode excitation at the cathode contact is negligibly small for a metallic contact, but may be quite large with a suitably doped n(+) contact. In this case the interaction of carrier mode and total current (EM-mode) in the sample gives rise to a set of coupled-mode instabilities with frequencies specified approximately by nf sub o, where f sub o is the transit-time frequency of the sample, and n is an integer. Under optimum conditions for oscillations the electronic Q of the fundamental mode is of the order of ten. (Author)
AD-668 130 HC$3.00 MF$0.65

THE GUNN EFFECT IN n-CdTe.
Journal article,
Massachusetts Inst of Tech Lexington Lincoln Lab

Michael R. Oliver, and Arthur G. Foyt. 19 Jun 67, 3p Rept no. JA-3086
ESD-TR-68-5
Contract AF 19 (628)-5167
Availability: Published in IEEE Transactions on Electron Devices, vED-14 n9 p617-8 Sep 1967.

Descriptors: (*Semiconductors, Cadmium compounds), (*Cadmium compounds, Electrical properties), Doping, Electric fields, Cryogenics, Carriers (Semiconductors), Etching, Oscillation, Measuring devices (Electrical + electronic), Transport properties, Resistance (Electrical), Tellurides, Theses.
Identifiers: Gunn effect, Cadmium telluride, Pulsed operation, Negative impedance.

Gunn-effect oscillations were observed from samples of n-CdTe 25 to 450 microns long with doping levels between 5x10 to the 14th power and 5.3x10 to the 15th power/cc. The room temperature threshold electric field for these oscillations varies from about 9500 V/cm for samples 450 microns long to about 15000 V/cm for samples 25 microns long. For samples longer than 80 microns, the oscillation is seen as a train of spikes in current. The period of these spike waveforms increases linearly with sample length, giving a calculated value of 0.7x10 to the 7th power cm/s for the high-field domain drift velocity. At 77 degrees K, the threshold electric field drops to about 8000 V/cm for 150 micron samples and the domain drift velocity increases by about 25 percent. In all samples tested, a current runaway effect is observed after several cycles of oscillation, with the runaway occurring sooner for increasing voltage drive to the sample. This runaway dominates the sample behavior for driving voltages well above Gunn-effect threshold. (Author)
AD-668 186 Not available from CFSTI.

POLARIZATION AND INTENSITY OF RAMAN SCATTERING FROM PLASMONS AND PHONONS IN GALLIUM ARSENIDE.
Journal article,
Massachusetts Inst of Tech Lexington Lincoln Lab
Aram Mooradian, and Alan L. McWhorter. 7 Jul 67, 5p Rept no. JA-3060
ESD-TR-68-3
Contract AF 19 (628)-5167
Availability: Published in Physical Review Letters, v19 n15 p849-52 Oct 9 1967.

Descriptors: (*Semiconductors, Raman spectroscopy), (*Gallium arsenides, *Raman spectroscopy), Coherent radiation, Scattering, Polarization, Intensity, Phonons, Plasma medium.
Identifiers: Plasmons.

The polarization and intensity of Raman scattered light from plasmons and phonons in gallium arsenide was measured and compared to theory. The agreement was good and yielded values of the Raman tensor and the electro-optic coefficient of gallium arsenide. (Author)
AD-668 193 Not available from CFSTI.

MAGNETIC INTERACTIONS AND SPIRAL GROUND STATES IN SPINELS, WITH APPLICATION TO ZnCr2Se4.
Massachusetts Inst of Tech Lexington Lincoln Lab
For primary bibliographic entry see Field 20C.
AD-668 194 Not available from CFSTI.

INVERSION ASYMMETRY EFFECTS ON OSCILLATORY MAGNETORESISTANCE IN HgSe.
Journal article,
Massachusetts Inst of Tech Lexington Lincoln Lab
S. H. Groves, P. W. Wyatt, and Laura M. Roth. Sep 67, 6p Rept no. JA-3087
ESD-TR-68-6
Contract AF 19 (628)-5167
Prepared in cooperation with Tufts Univ., Medford, Mass.
Availability: Published in Physical Review Letters, v19 n10 p576-80 Sep 4 1967.

Descriptors: (*Semiconductors, Mercury compounds), (*Band theory of solids, Mercury compounds), Magnetic fields, Crystal structure, Carriers (Semiconductors), Selenides, Hamiltonian, Wave functions, Resistance (Electrical), Periodic variations.
Identifiers: Magnetoresistive effect, Mercuric selenide, Zincblende splittings, Eigenvalues.

A beat frequency in the oscillatory magnetoresistance of zincblende HgSe is interpreted as arising from the inversion-asymmetry splitting, which is shown to be about 0.007 eV at the Fermi level appropriate to 1 x 10 to the 18th power electrons/cc.
AD-668 198 Not available from CFSTI.

RESEARCH IN MATERIALS SCIENCE AND ENGINEERING.
Massachusetts Inst of Tech Cambridge
For primary bibliographic entry see Field 11G.
AD-668 215 HC$3.00 MF$0.65

DIELECTRIC LOSS IN CaF2 DOPED WITH OXYGEN IONS.
Utah Univ Salt Lake City Inst of Materials Research
For primary bibliographic entry see Field 7D.
AD-668 275 Not available from CFSTI.

DIRECT SPIN-PHONON INTERACTION IN SOLID He3.
Scientific Interim rept.,
Boston Univ Mass Dept of Physics
Wijit Senghaphan, and George O. Zimmerman. 11 Apr 68, 7p
AFOSR-68-0787
Grant AF-AFOSR-1117-66
Availability: Published in Physical Review Letters, v20 n8 p371-4 Feb 1968.

Descriptors: (*Solidified gases, Helium), (*Phonons, Interactions), (*Nuclear magnetic resonance, Helium), Cryogenics, Relaxation time, Crystal lattices, Sound signals, Resonant frequency.
Identifiers: *Spin-lattice relaxation.

The spin lattice relaxation time in solid He3 has been measured at temperatures between 0.07 degree and 1 degree K at several pressures and NMR frequencies. It was found that the relaxation time, below 0.2 degree K, decreases if sound at the Larmor frequency is induced by means of a piezoelectric crystal. This resonance is very sharp. No resonance (decrease) in relaxation time was observed as a function of J, the spin-spin interaction energy. (Author)
AD-668 317 Not available from CFSTI.

ELECTRICAL RESISTIVITY OF NiAl, CoAl, NiGa, AND CoGa,
Northwestern Univ Evanston Ill Dept of Materials Science
Y Yamaguchi, D. A. Kiewit, T. Aoki, and J. O. Brittain. 1 Jan 68, 4p
AFOSR-68-0800
Grant AF-AFOSR-466-64
Availability: Published in Journal of Applied Physics, v39 n1 p231-2 Jan 1968.

Descriptors: (*Resistance (Electrical), Intermetallic compounds), Nickel alloys, Cobalt alloys, Aluminum alloys, Gallium alloys, Transport properties, Temperature, Crystal lattice defects, Cryogenics, Band theory of solids.
Identifiers: Nickel aluminides, Cobalt aluminides, Nickel gallinides, Cobalt gallinides.

The electrical resistivities of NiAl, CoAl, NiGa, and CoGa were measured at 4.2 degrees and 297 degrees K by the usual potentiometric method. The variations of resistivities of these intermetallic compounds with temperature and composition indicate that the compounds are metallic, although not good conductors, and that the point-defect concentration present in these materials is important in considerations of the electrical transport properties. The variations of resistivities with composition indicated that the point defects in NiAl, CoAl, and CoGa tend to cluster as the composition departs from stoichiometry. (Author)
AD-668 318 Not available from CFSTI.

SEARCH FOR SURFACE MODES OF LATTICE VIBRATIONS IN MAGNESIUM OXIDE,
Oesterreichische Studiengesellschaft Fuer Atomenergie G M B H Seibersdorf Physics Inst
K. H. Rieder, and E. M. Horl. 1967, 10p
Contract AF 61 (052)-638
Availability: To be published in Physical Review Letters.

Descriptors: (*Magnesium oxides, Crystal lattices), (*Crystal lattices, Dynamics), Grain size, Surface properties, Neutron scattering, Inelastic scattering, Austria.
Identifiers: Lattice vibrations, Debye temperature, Lattice dynamics.

The report describes inelastic neutron scattering experiments which were performed on crystalline samples of magnesium oxide with various grain sizes in order to get information about the change of the frequency spectrum due to surface effects.
AD-668 355 Not available from CFSTI.

ANISOTROPY OF THE NIOBIUM ENERGY GAP BY A SINGLE CRYSTAL TUNNELING TECHNIQUE.
Technical rept.,
Massachusetts Inst of Tech Cambridge Dept of Metallurgy and Materials Science
M. L. A. MacVicar, and R. M. Rose. 6 Mar 68, 5p Rept no. TR-5
Contract Nonr-3963 (16)
Availability: Published in Physics Letters, v25A n9 p681-2 Nov 1967.

Descriptors: (*Superconductors, Niobium), (*Niobium, *Band theory of solids), Single crystals, Tunneling (Electronics), Crystal lattices, Anisotropy, Crystal growth, Resistance (Electrical).

The energy gap for the simple crystallographic directions of superconducting Nb was determined by a single crystal tunneling technique. (Author)
AD-668 360 Not available from CFSTI.

SPECIFIC HEAT OF PLATINUM FROM 1.4 TO 100K,
Carnegie-Mellon Univ Pittsburgh Pa
For primary bibliographic entry see Field 20M.
AD-668 361 Not available from CFSTI.

ENERGY LOSS MECHANISMS OF PARTICLES IN SEMICONDUCTORS.
Holland Hitch Co Mich
For primary bibliographic entry see Field 18D.
AD-668 385 Not available from CFSTI.

BAND STRUCTURE OF BISMUTH: PSEUDOPOTENTIAL APPROACH,
Pittsburgh Univ Pa Dept of Physics
Stuart Golin. 15 Feb 68, 11p
AFOSR-68-0820
Grant AF-AFOSR-196-66
Prepared in cooperation with Illinois Univ., Urbana.
Availability: Published in The Physical Review, v166 n3 p643-51 Feb 15 1968.

Descriptors: (*Bismuth, *Band theory of solids), Anisotropy, Perturbation theory, Carriers (Semiconductors), Brillouin zones, Wave functions, Hamiltonian.
Identifiers: Pseudopotentials, Effective mass,

Spin-orbit coupling, Fermi surfaces, Computer analysis.

The electronic band structure of bismuth is studied by means of a pseudopotential approach. The Lin-Kleinman pseudopotential was adopted; its parameters were adjusted slightly to bring the band structure into agreement with two known energy differences in bismuth. With this pseudopotential, the band structure along symmetry lines and planes is calculated and the effective masses of the carriers are studied. The band structure is in good agreement with optical data and with effective-mass anisotropies, but the magnitude of the effective masses may differ from experiment by a factor of 3. Using the experimental effective masses and g factor of the holes, we infer the energy-level scheme at T near E sub F. Also, we have tentatively identified a higher-lying band which has been experimentally observed. A very efficient method of calculating nonlocal and spin-orbit coupling terms in k dot pi perturbation theory is presented. (Author)
AD-668 416 Not available from CFSTI.

SIMULTANEOUS PARALLEL PUMPING OF NUCLEAR AND ELECTRONIC SPIN WAVES,
Pittsburgh Univ Pa Dept of Physics
F. Ninio, and F. Keffer. 10 Jan 68, 18p
AFOSR-68-0802
Grant AF-AFOSR-196-66
Availability: Published in Physical Review, v165 n2 p735-50 Jan 10 1968.

Descriptors: (*Magnetic moments, Interactions), (*Nuclear magnetic resonance, Magnetic materials), Excitation, Pumping (Electronics), Ferrites, Nuclear spins, Hamiltonian, Perturbation theory, Hyperfine structure, Manganese compounds, Rubidium compounds, Iron compounds, Fluorides.
Identifiers: Spin waves, Magnons, Parallel pumping, Ferromagnetic resonance, Antiferromagnetic resonance.

In a magnetic medium in which the nuclei carry a magnetic moment, there exists a spectrum of nuclear spin waves in addition to the usual electronic spin waves, provided the temperature is sufficiently low. The possibility is investigated of joint excitation of nuclear and electronic magnons by parallel pumping; this process is analogous to 'exchange pumping' of acoustic and exchange magnons in a ferrimagnet. First a simple ferromagnet is considered, then the ferrimagnet manganese ferrite, and finally the cubic antiferromagnet RbMnF3. It is suggested that the process should be feasible, and that it should be possible thereby to excite nuclear spin waves of arbitrary k. (In ordinary NMR only k=0 is excited.) The threshold pump field in a typical material is estimated to be of order 36 Oe in magnitude, but it can be smaller in carefully prepared samples. (Author)
AD-668 422 Not available from CFSTI.

s-d MODEL WITH NONSPHERICAL FERMI SURFACE,
Pittsburgh Univ Pa Dept of Physics
P. R. P. Silva. 15 Feb 68, 26p
AFOSR-68-0804
Grant AF-AFOSR-196-66
Availability: Published in The Physical Review, v166 n3 p679-702 Feb 15 1968.

Descriptors: (*Magnetic moments, Interactions), (*Band theory of solids, Metals), Brillouin zones, Nuclear spins, Hamiltonian, Perturbation theory, Wave functions, Nuclear magnetic resonance, Mossbauer effect, Neutron scattering, Ferromagnetism, Paramagnetic materials.
Identifiers: Fermi surfaces, Heisenberg model, Curie temperature, Schrodinger equation, Spin waves.

A study is made of the effects of a nonspherical and multiply connected Fermi surface on the properties of the Ruderman-Kittel-Kasuya-Yosida s-d interaction between localized spins and the conduction electrons. At a critical value of the conduction-electron concentration N sub e, the Fermi surface touches a number of Brillouin-zone faces, giving rise to a number of necks as in copper and nickel. It is shown that, in this region of electron concentration, the paramagnetic Curie temperature theta exhibits a kink associated with a discontinuity in the exchange-stiffness parameter. These effects are expected to be more pronounced in materials with a large number of necks in the multiply connected Fermi surface. The simplest possible model consistent with the crystal symmetry is chosen and the Bragg condition at the Brillouin-zone faces, i.e., a tight-binding approximation for the conduction electrons; but a number of results may be shown to be model-independent. In the region corresponding to the spherical Fermi surface, theta is nearly proportional to (N sub e)to the 1/3 power, and the model-dependent contribution to theta is relatively small, at least for the simple cubic structure.
AD-668 424 Not available from CFSTI.

THE OPTICAL SPECTRUM AND ZEEMAN EFFECT OF CaF2:Eu (2+).
Rept. for Sep-Dec 67,
Aerospace Corp El Segundo Calif Lab Operations
Paul P. Kisliuk, Harry H. Tippins, Chester A. Moore, and Slava A. Pollack. Feb 68, 28p Rept no. TR-0158 (9230-02)-4
SAMSO-TR-68-144
Contract F04695-67-C-0158

Descriptors: (*Crystal lattice defects, *Electron transitions), (*Europium, Electron transitions), Calcium fluorides, Impurities, Ions, Fluorescence, Relaxation time, Spectroscopy, Zeeman effect, Atomic orbitals, Excitation, Lasers, Materials.

New measurements of the Zeeman effect and of the fluorescent lifetime as a function of temperature of Eu (2+) in CaF2 are reported. Estimates of the theoretical parameters are made, and it is shown that neither these estimated values nor the magnetic splitting support those simplified models, used to explain the Faraday rotation, that neglect either the crystal field or the Coulomb interaction between the 5d and the (4f) (6) electrons. Evidence is given that the relative intensity of the Zeeman components in emission is dominated by 'spin-memory' effects rather than by thermalization between the Zeeman levels of the excited state. (Author)
AD-668 443 HC$3.00 MF$0.65

FLUORESCENCE OF DOPED CRYSTALS OF ANTHRACENE, NAPHTHALENE, AND PHENANTHRENE UNDER HIGH PRESSURES: THE ROLE OF EXCIMERS IN ENERGY TRANSFER TO THE GUEST MOLECULES,
Aerospace Corp El Segundo Calif Materials Sciences Lab
For primary bibliographic entry see Field 7E.
AD-668 444 HC$3.00 MF$0.65

OPTICAL SPECTRUM OF Cr (3+) IONS IN SPINELS,
Aerospace Corp El Segundo Calif Lab Operations
P. P. Kisliuk, D. L. Wood, R. M. MacFarlane, G. F. Imbusch, and D. M. Larkin. Mar 68, 35p Rept no. TR-0158 (9230-02)-3
SAMSO-TR-68-148
Contract F04695-67-C-0158

Descriptors: (*Crystal lattice defects, Spectroscopy), (*Chromium, Spectroscopy), Spinels, Impurities, Absorption spectrum, Fluorescence, Field theory, Atomic orbitals, Excitation, Spectra (Visible + ultraviolet).

The optical absorption and fluorescence spectra of two spinels, ZnAl2O4:Cr (3+) and MgAl2O4:Cr (3+), were measured at temperatures between 4.2K and room temperature, and the data are fitted to a crystal field theory that includes spin-orbit coupling and the trigonal field of the D3 site. The parameters for a best fit for both crystals are: Delta = 18,250/cm, zeta = 250/cm, v = -200/cm, v' = -1700/cm, and k = 0.7. The (2)E and (4)A2 splittings, observed directly in the ZnAl2O4:Cr (3+) spectrum, are satisfactorily accounted for by the theory. The intensity of the R-lines is shown to be due to magnetic dipole transitions, and fluorescence lifetimes agree well with calculated values. Vibrational sidebands and pair lines observed in fluorescence are identified. (Author)
AD-668 446 HC$3.00 MF$0.65

THEORY OF FERRIMAGNETISM IN INSULATORS.
Battelle Memorial Inst Columbus Ohio Columbus Labs
For primary bibliographic entry see Field 20C.
AD-668 458 HC$3.00 MF$0.65

FAST RECOVERY OF ELECTRON IRRADIATED GERMANIUM,
Ecole Normale Superieure Paris (France) Laboratoire de Physique
J. Bourgoin, and P. Baruch. 15 Jan 68, 14p Rept no. Scientific-1
AFCRL-68-0213
Contract F61052-67-C-0002

Descriptors: (*Germanium, Electron bombardment), (*Semiconductors, Electron bombardment), Radiation damage, Carriers (Semiconductors), Annealing, Crystal lattice defects, Transients, Antimony, Doping, Mathematical models, France.

The fast recovery of electron concentration after a burst of 1 MeV electrons (1 mA during 15 microsec) has been studied near 100 degrees K, in high purity n-type Germanium (10 to the 13th power to 3 x 10 to the 13th power Sb/cc). Three different stages have been observed. (1) A fast decrease (10 microsec) of excess carrier concentration. (2) A further decrease below the initial concentration, during 6 ms. This stage can be attributed to fillind of traps either created by irradiation, or grown in the crystal. (3) A return towards the initial concentration, through defect annealing. The time constant, at 100 degrees K, is 24 ms, and the activation energy, near 100 degrees K, is 0.14 eV. This stage appears negligible below 60 degrees K, as expected if it corresponds to the '65 degrees K defect.' This behavior can be interpreted with a model based on the creation of a transient defect, stabilized by electronic capture, and then decaying by the usual annealing process. (Author)
AD-668 468 HC$3.00 MF$0.65

LOW TEMPERATURE IRRADIATION AND ANNEALING OF N-TYPE GERMANIUM; EFFECTS OF OPTICAL BLEACHING,
Ecole Normale Superieure Paris (France) Laboratoire de Physique
J. Zizine. 15 Jan 68, 16p Rept no. Scientific-2
AFCRL-68-0214
Contract F61052-67-C-0002
See also Scientific report no. 1, AD-668 468. Proceedings of Conference on Radiation Effects in Semiconductors (1967) New York, 1968.

Descriptors: (*Germanium, Electron bombardment), (*Semiconductors, Electron bombardment), Radiation damage, Cryogenics, Electrical conductance, Recombination reactions, Crystal lattice defects, Carriers (Semiconductors), Hall effect, Annealing, Recovery, Illumination, France.

The isothermal recovery of n-type germanium after irradiation by electrons at 20 degrees K is studied by electrical conductivity measurements around 65 degrees K. This study shows that the reaction involved in this temperature range is a diffusion controlled recombination of strongly correlated pairs, thus indicating close vacancy-interstitial pairs. The isochronal recovery of n-type germanium after irradiation by electrons at 20 degrees K is studied by Hall effect and resistivity measurements. Results are discussed.
AD-668 469 HC$3.00 MF$0.65

Group 20L — Solid-state physics

PHOTOCONDUCTIVITY SPECTRA OF LOW-TEMPERATURE ELECTRON-IRRADIATED GERMANIUM,
Ecole Normale Superieure Paris (France) Laboratoire de Physique
J. E. Fischer, H. Zizine, and M. Cherki. 15 Jan 68, 13p Rept no. Scientific-3
AFCRL-68-0215
Contract F61052-67-C-0002

Descriptors: (*Germanium, Electron bombardment), (*Semiconductors, Electron bombardment), Radiation damage, Photoconductivity, Cryogenics, Doping, Diffusion, Antimony, Annealing, Crystal lattice defects, Impurities, France.

Photoconductivity spectrum of n type germanium irradiated at 4 degrees K and 20 degrees K have been measured. An optical quenching phenomena associated with a level at 5.8 microns has been observed in pure sample doped with 3 x 10 to the 13th power Sb/cc irradiated at 4 degrees K with a dose of 5 x 10 to the 14th power e/cm sq of 1.5 MeV. This quenching phenomena disappeared after 90 degrees K annealing. (Author)
AD-668 470 HC$3.00 MF$0.65

ENHANCED DIFFUSION IN GERMANIUM,
Ecole Normale Superieure Paris (France) Laboratoire de Physique
For primary bibliographic entry see Field 20M.
AD-668 471 HC$3.00 MF$0.65

RESEARCH ACTIVITIES IN THE FIELD OF MATERIALS SCIENCE.
North Carolina Univ Chapel Hill Materials Research Center
For primary bibliographic entry see Field 11G.
AD-668 501 HC$3.00 MF$0.65

ACOUSTOELECTRIC EFFECTS IN SOLIDS.
Scientific rept. (Final), 1 Apr 66-30 Sep 67,
Norwegian Defence Research Establishment Kjeller
Andreas Rannestad. 26 Oct 67, 13p Rept no.
NDRE-E-113
AFCRL-68-0136
Contract AF 61 (052)-958

Descriptors: (*Semiconductors, Electrical properties), (*Piezoelectric crystals, Semiconductors), Cadmium sulfides, Zinc compounds, Oxides, Mobility, Electric fields, Electric currents, Electrooptics, Oscillation, Carriers (Semiconductors), Crystal lattices, Photoelectric materials, Norway.
Identifiers: *Acoustoelectric effect, Acoustic waves.

The report gives a summary of the investigations undertaken during the contract period, and is concerned with the electroacoustic and electrooptic interaction in piezoelectric semiconductors. Particular emphasis has been placed on current saturation and electron drift mobility in CdS and ZnO and the electric field distribution in CdS. (Author)
AD-668 503 HC$3.00 MF$0.65

MACS J. A PROGRAM FOR COMPUTING CRYSTAL PHONON DISPERSION RELATIONS, STRUCTURE FACTORS FOR NEUTRON INELASTIC SCATTERING, AND JACOBIAN MATRICES,
Idaho Nuclear Corp., Idaho Falls.
For primary bibliographic entry see Field 20H.
For abstract, see NSA 22 08.
IN-1147 HC$3.00 MF$0.65

CONTRIBUTION OF THERMAL NOISE TO THE LINE WIDTH OF JOSEPHSON RADIATION FROM SUPERCONDUCTING POINT CONTACTS.
National Bureau of Standards, Boulder, Colo.
R. A. Kamper, R. H. Silver, and J. E. Zimmerman. 14 Jul 67, 3p NASA-CR-93734, NBS-R-441
Spon- Supported in Part By Nasa Prep- Prepared in Cooperation With Ford Motor Co., Dearborn, Mich.

Descriptors: *Josephson junctions, *Line spectra, *Thermal noise, Cryogenics, Electric contacts, Frequency modulation, Radiation spectra, Thermometers, Voltmeters.

For abstract, see STAR 06 10.
N68-19578 HC$3.00 MF$0.65

A STUDY OF DEFECT STRUCTURES WITH THE FIELD ION MICROSCOPE SEMIANNUAL REPORT, 1 SEP. 1967 - 29 FEB. 1968.
Florida Univ., Gainesville. Dept. of Metallurgical and Materials Engineering.
J. J. Hren, R. W. Newman, R. C. Sanwald, and U. T. Son. 29 Feb 68, 177p NASA-CR-93720, SAR-4
Contract NGR-10-005-039

Descriptors: *Crystal dislocations, *Electron microscopes, *Field emission, *Platinum, *Structural analysis, Heat treatment, Polyhedrons, Quenching (cooling), Voids.

For abstract, see STAR 06 10.
N68-19792 HC$3.00 MF$0.65

DEFECT PRODUCTION IN SINGLE CRYSTAL RESULTING FROM ION BOMBARDMENT SEMIANNUAL STATUS REPORT, 1 JUL. - 31 DEC. 1967.
Hiram Coll., Ohio. X-ray Physics Lab.
L. B. Shaffer. 31 Jan 68, 7p NASA-CR-93768, SASR-3
Contract NGR-36-019-001

Descriptors: *Crystal defects, *Vacuum systems, *X ray spectroscopy, Ion irradiation, Metal crystals, Single crystals.

For abstract, see STAR 06 10.
N68-19955 HC$3.00 MF$0.65

ELECTRON-BEAM, CRYSTALLIZATION OF SILICON, GERMANIUM, AND CADMIUM SULFIDE.
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
J. C. Evans, Jr.. Apr 68, 24p NASA-TN-D-4522
Contract 120-33-01-02-22

Descriptors: *Electron microscopes, *Polycrystals, *Semiconducting films, Cadmium sulfides, Crystal growth, Crystal structure, Crystallization, Electron beams, Germanium, Glass, Irradiation, Plastics, Radiation effects, Silicon, Substrates.

For abstract, see STAR 06 10.
N68-20295 HC$3.00 MF$0.65

IMPEDANCE CHARACTERISTICS OF IRRADIATED THIN FILMS FINAL REPORT, 1 JUN. 1965 - 31 AUG. 1967.
Southern Methodist Univ., Dallas, Tex. Inst. of Technology.
R. F. Eberline, D. S. Glass, and L. L. Howard. 1 Dec 67, 75p NASA-CR-93772, PR-2
Contract NGR-44-007-006

Descriptors: *Bismuth compounds, *Electrical impedance, *Infrared radiation, *Thin films, Circuits, Dynamic characteristics, Electrical resistance, Electron irradiation, Radiation effects.

For abstract, see STAR 06 10.
N68-20347 HC$3.00 MF$0.65

INVESTIGATIONS OF ELECTRON EMISSION CHARACTERISTICS OF LOW WORK FUNCTION SURFACES FINAL REPORT, 28 SEP. 1966 - 13 NOV. 1967.
Field Emission Corp., Mcminnville, Oreg.
A. E. Bell, L. C. Crouser, B. E. Evans, R. W. Strayer, and L. W. Swanson. Nov 67, 107p NASA-CR-93809
Contract NASW-1516

Descriptors: *Adsorption, *Electron emission, *Work functions, Cesium fluorides, Energy distribution, Mercury (metal), Molybdenum, Oxygen, Tungsten.

For abstract, see STAR 06 10.
N68-20481 HC$3.00 MF$0.65

20M. Thermodynamics

COMPARISONS OF EXPERIMENTAL AND THEORETICAL HEAT TRANSFER TO A YAWED SPHERE-CONE MODEL AT SUPERSONIC SPEEDS,
Naval Ordnance Lab., White Oak, Md.
Lionel Pasiuk. 6 Dec 63, 11p NOLTR-63-208

Descriptors: (*Heat transfer, Conical bodies), Aerodynamic heating, Yaw, Supersonic flow, Reentry vehicles, Stagnation point, Laminar boundary layer, Roll, Naval research.

Theoretical laminar heat transfer rates to a sphere-cone model at angles of yaw up to 18 degrees are compared with wind tunnel data measured at mach numbers of 3.2 and 4.8. Two methods of heat transfer prediction have been chosen--the methods of Beckwith and Vagliolaurin. These require that the inviscid streamline pattern on the surface of the yawed spherecone model be known. These streamlines have been calculated from measured surface pressure distributions. The theory of Beckwith agrees reasonably well with the experimental data. (Author)
AD-448 887 HC$3.00

THERMODYNAMIC PROPERTIES OF BINARY MIXTURES OF n-ALKANES,
Stanford Univ Calif Dept of Chemistry
For primary bibliographic entry see Field 7D.
AD-668 004 Not available from CFSTI.

ELECTROSIMULATION OF HEAT EXCHANGE IN HEAT EXCHANGERS OF THE REGENERATIVE TYPE,
Foreign Technology Div Wright-Patterson AFB Ohio
For primary bibliographic entry see Field 13A.
AD-668 032 HC$3.00 MF$0.65

SOLDERLESS THERMAL CONNECTOR FOR USE AT LOW TEMPERATURES,
Ohio State Univ Columbus
R. I. Boughton, N. R. Brubaker, and R. J. Sarwinski. 27 Mar 67, 4p
AFOSR-68-0786
Grant AF-AFOSR-1051-66
Availability: Published in The Review of Scientific Instruments, v38 n8 p1177-8 Aug 1967.

Descriptors: (*Disconnect fittings, Thermal conductivity), Couplings, Cryogenics, Cylindrical bodies, Copper, Nylon, Gold, Plating, Soldered joints, Silver, Performance (Engineering).
Identifiers: *Thermal connectors.

A new type of thermal connector capable of use at low temperatures is described. The connector can be easily disconnected and reused with a minimum of care. (Author)
AD-668 046 Not available from CFSTI.

ENTROPY OF TURBULENT GAS: MACROSCOPIC AND TURBULENT PARTS. BOUNDARY-LAYER: EXPRESSIONS FOR CELERITIES OF FILTERED FLUCTUATIONS; FIRST MEASUREMENTS FOR TEMPERATURE FLUCTUATIONS.
Aix-Marseille Univ (France) Institut de Mecanique Statistique de La Turbulence
For primary bibliographic entry see Field 20D.
AD-668 083 HC$3.00 MF$0.65

HEAT EXCHANGE OF BODIES OF DIFFERENT FORM WITH TURBULENT FLOW OF AIR,

Foreign Technology Div Wright-Patterson AFB Ohio
V. K. Shchitnikov. 3 Aug 67, 41p Rept no. FTD-MT-67-74
Edited machine trans. of mono. Teplo-i Massoobmen tel a Okruzhayushchei Gazovoi Sredoi, Minsk, 1965 p86-111.

Descriptors: (*Convection (Heat transfer), Aerodynamic configurations), Spheres, Cylindrical bodies, Conical bodies, Disks, Flat plate models, Reynolds number, Turbulence, Metal plates, Heat exchangers, Equations of state, Heat transfer coefficients, USSR.
Identifiers: Translations.

The article gives the results of an experimental investigation of convective heat transfer between a sphere, a cylinder, a cone, a disc, a slab, and a plate and a stream of turbulent air, including the effect of the orientation of the body in the air stream. The experiments were made under identical thermal and hydrodynamic conditions, at Reynolds numbers from 10,000 to 150,000. The degree of turbulence was 2.4%. The experimental bodies were made of sheet copper 0.0015 meters thick with their dimensions given in a table. The results were correlated by similarity theory. (Author)
AD-668 096 HC$3.00 MF$0.65

STATISTICAL ANALYSIS OF TEMPERATURE DATA FROM WIND TUNNEL TEST OF A VON KARMAN RADOME.
Johns Hopkins Univ Silver Spring Md Applied Physics Lab
For primary bibliographic entry see Field 17I.
AD-668 135 HC$3.00 MF$0.65

AIR PROPERTIES AND FLOW CONDITIONS AROUND THE NOSE OF A BLUNT RADOME.
Johns Hopkins Univ Silver Spring Md Applied Physics Lab
For primary bibliographic entry see Field 17I.
AD-668 145 HC$3.00 MF$0.65

UNSTABLE CONVECTION HEAT EXCHANGE AND HYDRODYNAMICS IN CHANNELS (SURVEY OF LITERATURE ON SINGLE-PHASE HEAT TRANSFER AGENTS),
Foreign Technology Div Wright-Patterson AFB Ohio
E. K. Kalinin. 31 Aug 67, 28p Rept no. FTD-MT-24-188-67
Edited machine trans. of Akademiya Navuk BSSR. Vestsi. Seryya Fizika-Tekhnichnykh Navuk, n4 p1-22 1966.

Descriptors: (*Convection (Heat transfer), *Hydrodynamics), Stability, Laminar flow, Turbulence, Equations of motion, Acceleration, Incompressible flow, Drag, Thermal conductivity, Reviews, USSR.
Identifiers: Translations.

In this continuation of a survey of the published works of theoretical and experimental studies of unstable heat exchange and hydrodynamics in channels, the report reviews several preliminary mathematical formulas and criteria of the profiles of temperature and heat exchange, and attention is drawn to the relative paucity of theoretical and experimental studies in this area, both in the USSR and abroad. (Author)
AD-668 159 HC$3.00 MF$0.65

THERMO-MOLECULAR PRESSURE EFFECTS IN TUBES AND AT ORIFICES,
Advisory Group for Aerospace Research and Development Paris (France)
For primary bibliographic entry see Field 14B.
AD-668 251 HC$3.00 MF$0.65

THERMODYNAMICS AND HEAT TRANSFER,
Foreign Technology Div Wright-Patterson AFB Ohio
A. V. Bolgarskii, G. A. Mukhachev, and V. K. Shchukin. 14 Jul 67, 609p Rept no. FTD-HT-67-182
Edited trans. of mono. Termodinamika i Teploperedacha, Moscow, 1964 492p.

Descriptors: (*Thermodynamics, Textbooks), Heat transfer, Theory, Entropy, Gases, Internal combustion engines, Compressors, Gas turbines, Chemical reactions, Dissociation, Combustion, Reaction kinetics, Thermal conductivity, Fluid mechanics, Boundary layer, Heat shields, USSR.
Identifiers: Translations.

Thermodynamics: Parameters of a working medium; Heat capacities of gases; First law of thermodynamics; Basic thermodynamic processes; Second law of thermodynamics; Variation of entropy in processes--entropy diagrams; Real (natural) gases; Cycles of piston engines; Compressor; Cycles of gas-turbine installations; Flow of gases; Basic laws of thermodynamics in application to chemical processes; Equilibrium of thermodynamic systems and dissociation; Combustion processes; Kinetics of chemical reactions. Theory of heat exchange: Heat conductivity under stationary conditions; Heat transfer and methods of its investigation; Heat emission (transfer) during free and forced motion of a liquid (fluid); Heat transfer at high velocity of gas motion; Heat transfer in rarefied gases; Heat transfer during variation in aggregate state and with introduction of extraneous matter into the boundary layer; Radiant heat transfer; Heat transfer; Heat conductivity under unsteady conditions; Heat exchange equipment; Heat shielding (thermal protection).
AD-668 264 HC$3.00 MF$0.65

HELIUM SUPERFLOW THROUGH SARAN CHARCOAL,
Royal Military Coll of Canada Kingston (Ontario)
For primary bibliographic entry see Field 20D.
AD-668 269 Not available from CFSTI.

SPECIFIC HEAT OF PLATINUM FROM 1.4 TO 100K,
Carnegie-Mellon Univ Pittsburgh Pa
G. E. Shoemake, and J. A. Rayne. 12 Feb 68, 3p
Grant AF-AFOSR-870-65
Availability: Published in Physics Letters, v26a n6 p222-3 12 Feb 1968.

Descriptors: (*Specific heat, *Platinum), Cryogenics, Correlation techniques, Curve fitting, Least squares method, Interactions, Mathematical models.
Identifiers: Debye temperature, Elastic constants, Computer analysis.

The specific heat of high purity platinum has been measured from 1.4 to 100 degrees K. No anomalous temperature dependence of the lattice heat capacity is observed. The corresponding variation of the Debye temperature is compared to that calculated from elastic data using a central force model. (Author)
AD-668 361 Not available from CFSTI.

ANGULAR DISTRIBUTION OF RADIATION REFLECTED FROM CARBON DIOXIDE CRYODEPOSITS FORMED ON 77K SURFACES.
Arnold Engineering Development Center Arnold Air Force Station Tenn
For primary bibliographic entry see Field 20F.
AD-668 432 HC$3.00 MF$0.65

TABLES OF COLLISION INTEGRALS FOR THE (m, 6) POTENTIAL FOR TEN VALUES OF m.
National Bureau of Standards Washington D C
For primary bibliographic entry see Field 7D.
AD-668 433 HC$3.00 MF$0.65

THEORY OF FERRIMAGNETISM IN INSULATORS.
Battelle Memorial Inst Columbus Ohio Columbus Labs
For primary bibliographic entry see Field 0C.
AD-668 458 HC$3.00 MF$0.65

ENHANCED DIFFUSION IN GERMANIUM,
Ecole Normale Superieure Paris (France) Laboratoire de Physique
A. Brelot. 15 Jan 68, 14p Rept no. Scientific-4
AFCRL-68-0216
Contract F61052-67-C-0002
See also Scientific no. 1, AD-668 468.

Descriptors: (*Germanium, Radiation effects), Thermal diffusion, Impurities, High-temperature research, Crystal lattice defects, Mobility, Proton bombardment, Test methods.
Identifiers: *Enhanced diffusion.

The dynamic behaviour of radiation defects at high temperatures (600C) has been investigated by the means of a substitutional impurity enhanced diffusion study. After irradiation it is found that the impurity has diffused much faster than expected from thermal diffusion. This enhanced diffusion appears to be governed by diffusion of excess vacancy created by the irradiation. It is thus possible to measure a defect migration energy and a diffusion length. (Author)
AD-668 471 HC$3.00 MF$0.65

INVESTIGATION OF HEAT TRANSFER TO ORGANIC LIQUIDS,
Foreign Technology Div Wright-Patterson AFB Ohio
For primary bibliographic entry see Field 18J.
AD-668 507 HC$3.00 MF$0.65

EXPERIMENTAL STUDY OF A TRANSPIRATION-COOLED, CONSTRICTED ARC.
Minnesota Univ Minneapolis Heat Transfer Lab
For primary bibliographic entry see Field 20I.
AD-668 510 HC$3.00 MF$0.65

VORTEX EFFECTS IN A TURBINE STAGE,
Foreign Technology Div Wright-Patterson AFB Ohio
For primary bibliographic entry see Field 21E.
AD-668 511 HC$3.00 MF$0.65

GAS TURBINE CYCLE CALCULATIONS: DIFFERENTIAL METHODS IN THE ANALYSIS OF EQUILIBRIUM OPERATION,
National Research Council of Canada, Ottawa (Ontario). Div. of Mechanical Engineering.
For primary bibliographic entry see Field 21E.
AD-820 539 HC$3.00 MF$0.65

THERMAL CONDUCTIVITY OF SELECTED MATERIALS. PART 2,
National Standard Reference Data System.
C. Y. Ho, R. W. Powell, and P. E. Liley. Feb 68, 156p
Prepared in cooperation with Purdue Univ., West Lafayette, Ind. Thermophysical Properties Research Center. Also available from Superintendent of Documents, GPO, Washington, D. C. 20402 $2.00.

Descriptors: (*Thermal conductivity, Tables), Magnesium, Titanium, Chromium, Nickel, Zinc, Zirconium, Niobium, Molybdenum, Cadmium, Tin, Tantalum, Lead, Graphite, Pyrolytic graphite, Ammonia, Methane, Acetones, Standards.

The work comprises the critical evaluation, analysis, and synthesis of the available thermal conductivity data and the generation of recommended values for twelve metallic elements, mainly for the solid state, for a range of graphites, and for three fluids in the gaseous state. These are cadmium, chromium, lead, magnesium, molybdenum, nickel, niobium, tantalum, tin, titanium, zinc, zirconium, Acheson graphite, ATJ graphite, pyrolytic graphite, 875S graphite, 890S graphite, acetone, ammonia, and methane. For each of the materials recommended values are given over a wide range of temperature. (Author)
NSRDS-NBS-16-Pt-2 HC$2.00 MF$0.65

CRYOGENIC PROPELLANT VENTING UNDER LOW PRESSURE CONDITIONS FINAL REPORT.
National Bureau of Standards, Boulder, Colo. Cryogenics Div.
For primary bibliographic entry see Field 21I.
For abstract, see STAR 06 10.
N68-19799 HC$3.00 MF$0.65

DETERMINATION OF THERMOPHYSICAL PROPERTIES OF ABLATIVE MATERIALS. PHASE 1 - LABORATORY DETERMINATIONS. PART B - THERMAL CONDUCTIVITY AND THERMAL DIFFUSIVITY.
TRW Systems, Redondo Beach, Calif.
For primary bibliographic entry see Field 21H.
For abstract, see STAR 06 10.
N68-19863 HC$3.00 MF$0.65

DESIGN, FABRICATION AND CALIBRATION OF SIX IRIDIUM VERSUS IRIDIUM-60 RODIUM THERMOCOUPLES FINAL REPORT.
Southern Research Inst., Birmingham, Ala.
19 May 65, 34p NASA-CR-61683, REPT.-7299-1481-11-37
NASA ORDER R-11

Descriptors: *Calibrating, *Iridium, *Rhodium, *Structural design, *Thermocouples, Temperature measuring instruments, Thermoelectricity, Transition metals.

For abstract, see STAR 06 10.
N68-19864 HC$3.00 MF$0.65

APPROXIMATE RELATIONS FOR LAMINAR HEAT-TRANSFER AND SHEAR-STRESS FUNCTIONS IN EQUILIBRIUM DISSOCIATED AIR.
National Aeronautics and Space Administration. Langley Research Center, Langley Station, Va.
E. V. Zoby. Apr 68, 21p NASA-TN-D-4484
Contract 129-01-03-08-23

Descriptors: *Approximation, *Axisymmetric bodies, *Blunt bodies, *Cones, *Enthalpy, *Flat plates, *Heat transfer, *Thermodynamic properties, Numerical analysis, Surface temperature.

For abstract, see STAR 06 10.
N68-20065 HC$3.00 MF$0.65

CRYOGENIC TEMPERATURE MEASUREMENT USING PLATINUM RESISTANCE THERMOMETERS.
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
J. H. Malone, D. H. Sinclair, and H. G. Terbeek. Apr 68, 37p NASA-TN-D-4499
Contract 128-31-06-36-22

Descriptors: *Cryogenic equipment, *Platinum, *Resistance thermometers, *Temperature measurement, Calibrating, Cryostats, Low temperature tests, Temperature scales.

For abstract, see STAR 06 10.
N68-20324 HC$3.00 MF$0.65

RADIANT-INTERCHANGE CONFIGURATION FACTORS FOR SPHERICAL AND CONICAL SURFACES TO SPHERES.
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
J. P. Campbell, and D. G. Mc Connell. Apr 68, 24p NASA-TN-D-4457
Contract 124-09-05-09-22

Descriptors: *Computer programs, *Heat transfer coefficients, *Radiative heat transfer, *Spheres, Conical bodies, Cryogenic rocket propellants, Curves, Geometry, Graphs (charts), Heat shielding, Mathematical models, Spherical shells, Surface properties.

For abstract, see STAR 06 10.
N68-20331 HC$3.00 MF$0.65

LOCAL HEAT TRANSFER FOR WATER IN ENTRANCE REGIONS OF TUBES WITH TAPERED FLOW AREAS AND NONUNIFORM HEAT FLUXES.
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
N. J. Sekas, and J. R. Stone. Apr 68, 18p NASA-TM-X-1554
Contract 120-27-02-03-22

Descriptors: *Circular tubes, *Convective heat transfer, *Heat transfer coefficients, *Tables (data), Flow measurement, Heat flux, Nusselt number, Water flow.

For abstract, see STAR 06 10.
N68-20338 HC$3.00 MF$0.65

HEAT-TRANSFER CORRELATION FOR GAS FLOW ACROSS HEATED BANKS OF WIRE MESHES OR TUBES.
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
B. L. Siegal. Apr 68, 25p NASA-TN-D-4514
Contract 120-27-04-56-22

Descriptors: *Convective heat transfer, *Correlation coefficients, *Gas flow, *Heat transfer coefficients, *Nitrogen, Air, Flow distribution, Helium, Hydrogen, Pipes (tubes), Surface temperature, Temperature distribution, Wire, Wire cloth.

For abstract, see STAR 06 10.
N68-20374 HC$3.00 MF$0.65

THERMODYNAMICS OF TRANSPORT PHENOMENA IN MEMBRANE SYSTEMS.
National Bureau of Standards, Boulder, Colo. Inst. for Materials Research.
H. J. M. Hanley. 1967, 8p
Journal of Chemical Education, v44 p717-23 Dec 1967.

Descriptors: (*Membranes, Transport properties), (*Irreversible processes, Membranes), Thermodynamics, Diffusion, Entropy, Statistical mechanics.

Some aspects of the thermodynamics of transport phenomena in systems with a membrane are discussed. Special consideration is given to the examination and comparison of the application of nonequilibrium thermodynamics to discontinuous systems, as opposed to the application of nonequilibrium thermodynamics to continuous systems.
PB-177 833 HC$3.00 MF$0.65

THIRD VIRIAL COEFFICIENTS OF NONPOLAR GASES AND THEIR MIXTURES.
National Bureau of Standards, Boulder, Colo., Inst. for Materials Research.
P. L. Chueh, and J. M. Prausnitz. 1967, 7p
Prepared in cooperation with California Univ., Berkeley. AIChE Journal, v13 n5 p896-902 Sep 1967.

Descriptors: (*Equations of state, Gases), (*Cryogenics, Equations of state), Phase studies, Hydrogen, Helium, Neon, Methane, Solidified gases, Pressure.
Identifiers: *Viral coefficients.

While much attention has been given to second virial coefficients of nonpolar gases, experimental and theoretical studies on third virial coefficients are scarce. This work presents a correlation of third virial coefficients within the framework of the corresponding states principle. The correlation is useful for estimating third virial coefficients of pure and mixed nonpolar gases, including the quantum gases helium, hydrogen, and neon. The importance of third virial cross coefficients in phase equilibrium predictions is illustrated with calculations for the solid-gas, methane-hydrogen system at 76K. Brief attention is given to the pressure series form of the virial equation. Because of fortuitous cancellations, it is shown that for reduced temperatures above 1.4, the pressure series, truncated after the second term, is applicable to a wider range of density than the density series truncated after the second term. However, when both series are truncated after the third term, the density series appears to be superior regardless of reduced temperature. (Author)
PB-177 834 HC$3.00 MF$0.65

QUALITY DETERMINATION OF LIQUID-SOLID HYDROGEN MIXTURES.
National Bureau of Standards, Boulder, Colo. Cryogenics Div.
For primary bibliographic entry see Field 21I.
PB-177 835 HC$3.00 MF$0.65

TRANSPORT PROPERTIES OF CRYOGENIC LIQUIDS AND THEIR MIXTURES.
National Bureau of Standards, Boulder, Colo. Cryogenics Div.
G. T. Preston, T. W. Chapman, and J. M. Prausnitz. 1967, 5p
Prepared in cooperation with California Univ., Berkeley. Cyogenics, v7 n5 p274-9 Oct 1967.

Descriptors: (*Liquefied gases, Transport properties), Mixtures, Helium group gases, Methane, Oxygen, Nitrogen, Carbon monoxide, Ethylenes, Diffusion, Viscosity, Thermal conductivity, Correlation techniques, Phase studies.

Transport properties of liquefied gases are required for rational design of cryogenic processes, but experimental studies of these properties are not plentiful, especially for mixtures. Correlations are now presented for three transport properties: viscosity, thermal conductivity, and diffusivity. A method is also proposed for applying these correlations to the prediction of mixture properties. The basis for the correlations is provided by the theory of corresponding states. Attention is restricted to simple liquids along the liquid-vapour saturation curve from the triple point temperature to temperatures close to the critical.
PB-177 836 HC$3.00 MF$0.65

20N. Wave Propagation

SCATTERING STUDIES.
Technical rept.,
Sylvania Electronic Systems-West Mountain View Calif Electronic Defense Labs
James E. Burke. Feb 68, 60p Rept no. EDL-M1049
ECOM-0181-M1049
Contract DAAB07-67-C-0181

Descriptors: (*Electromagnetic waves, *Scattering), Microwaves, Cylindrical bodies, Rayleigh waves, Optics, Phase studies, Computer programs, Numerical analysis, Intensity, Measurement, Propagation, Mathematical models, Theory, Polarization, Reflection, Geometry, Radar targets.

Various changes (circuitry modifications, the addition of auxiliary equipment, etc.) were made in our 5-mm microwave range in order to make it a more versatile tool to further basic and applied studies. These are discussed as well as examples of scattering data for a dynamic random distribution of spheres and for stationary finite cones and finite cylinders. The data presented includes results for both bistatic intensity measurements and bistatic amplitude and phase measurements. The implementation of a general computer program for calculating scattering from an arbitrarily shaped conductor is discussed. This program solves the exact integral equation for the currents induced on the scatterer; once these are known the scattered field can be calculated by numerical integration. The analytical basis for the program is discussed and results of applying the computer program to spheres are compared with exact results. (Author)
AD-667 943 HC$3.00 MF$0.65

MILLIMETER WAVE RADIOMETRIC DETECTION OF TARGETS OBSCURED BY FOLIAGE.
Ballistic Research Labs Aberdeen Proving Ground Md
For primary bibliographic entry see Field 17E.
AD-667 962 HC$3.00 MF$0.65

APPARENT POLEWARD MOTION OF ONSETS OF AURORAL ABSORPTION EVENTS,
Defence Research Telecommunications Establishment Ottawa (Ontario) Radio Physics Lab
For primary bibliographic entry see Field 4A.
AD-668 010 Not available from CFSTI.

INTERPRETATION AND APPLICATION OF TRANSIENT AND IMPULSE RESPONSE APPROXIMATIONS IN ELECTROMAGNETIC SCATTERING PROBLEMS.
Ohio State Univ Columbus Electroscience Lab
For primary bibliographic entry see Field 9C.
AD-668 124 HC$3.00 MF$0.65

AURORAL INPUT-OUTPUT EXPERIMENT.
Lockheed Missiles and Space Co Palo Alto Calif
Lockheed Palo Alto Research Lab
For primary bibliographic entry see [illegible]
AD-668 202 HC$ [illegible] 65

WAVE COUPLING IN MULTI-MODE, INHOMOGENEOUS IONIZED MEDIA, WITH APPLICATIONS TO ELECTRON STREAM-WHISTLER MODE INTERACTIONS,
Chalmers Univ of Technology Goteborg (Sweden) Research Lab of Electronics
O. E. H. Rydbeck. 1967, 41p
AFCRL-67-0580
Contract AF 61 (052)-864
Prepared in cooperation with Pennsylvania State Univ., University Park.
Availability: Published in Electromagnetic Wave Theory, Part 1. Proceedings of a Symposium, Delft (Netherlands) p45-84 Sep 1965.

Descriptors: (*Electromagnetic waves, Interactions), (*Whistlers, Interactions), Cyclotron waves, Electron beams, Ions, Theory, Polarization, Phase, Vector analysis, Partial differential equations, Sweden, Symposia.
Identifiers: Poynting vector.

The wave coupling theory developed in this paper is applied to analyse the intricate interactions--and mode transformations--that take place between cyclotron waves and whistler modes in a stationary, ionized medium permeated by a mono-velocity electron-ion stream. It has been possible to prove that whistlers become amplified by the streaming medium under certain conditions, and also to determine the magnitude of this amplification and its general dependence upon system parameters. Passive transformation of whistlers into cyclotron waves is another feature of the stream interaction. The magnitude of such a transformation, for example appearing as a 'reflection' of a fast cyclotron wave into a backward whistler mode, has also been evaluated. Finally it has been shown that the entire interaction formally can be treated as an electromagnetic barrier problem in terms of normalized electromagnetic and stream velocity fields, which contain the multi-mode WKB-type amplitude coefficients. The total energy flow of the system can then, quite simply, be obtained as a Poynting vector expressed in the normalized electromagnetic fields. (Author)
AD-668 274 Not available from CFSTI.

EXCITATION OF HYDROMAGNETIC WAVES IN THE EARTH'S UPPER ATMOSPHERE BY SOURCES OF FINITE EXTENT,
Texas Univ Austin Electrical Engineering Research Lab
For primary bibliographic entry see Field 20I.
AD-668 332 HC$3.00 MF$0.65

ELECTROMAGNETIC FIELDS IN THE OCEAN NEAR A SHORELINE (PART II).
Technical rept.,
Rhode Island Univ Kingston
Edmund J. Sullivan, and John E. Spence. 15 Sep 66, 53p
Contract Nonr-396 (10)

Descriptors: (*Electromagnetic fields, Oceans), Noise, Seacoast, Excitation, Ocean bottom sampling, Electric fields, Soils, Depth finding, Energy, Mathematical analysis, Distribution, Interactions, Air-to-underwater, Radio transmission, Electromagnetic waves, Ocean models, Magnetic fields, Air-to-surface, Propagation.
Identifiers: Micropulsations.

This report represents an extension of the work described in an earlier report. It is an analytical study of the electromagnetic field in the ocean resulting from excitation over land by natural electromagnetic noise such as micropulsations or ELF atmospherics. The main purpose of the study is to determine the relative importance of electromagnetic energy entering the ocean via the air-water interface versus energy entering via the soil and ocean bottom. Emphasis in this report is placed on a comparison between the vertical and horizontal components of the electric field. Vertical profiles of the horizontal and vertical electric field vectors are plotted for several values of frequency, ocean depth, and the distance from the shoreline. Finally, a comparison is made with some experimentally determined values of the horizontal electric field. (Author)
AD-668 341 HC$3.00 MF$0.65

SIGNAL DISTORTION IN ANISOTROPIC HOMOGENEOUS IONIZED MEDIA. PART I. LONGITUDINAL MAGNETIC FIELD,
Rydbeck Research Associates Fjaras (Sweden)
Bernt O. Ronnang. Apr 67, 58p Rept no. Scientific-7
AFCRL-67-0579
Contract AF 61 (052)-864
See also Scientific rept. no. 6, AD-654 323.

Descriptors: (*Electromagnetic waves, Propagation), (*Nuclear explosions, Blackout (Electromagnetic)), Magnetic fields, Signals, Velocity, Distortion, Transients, Integration, Saddle point method, Electric fields, Plasma medium, Mathematical prediction, Refractive index, Pulse height analyzers, Theory, Pulse modulation, Ionization.

This report deals with propagation of electro-magnetic transients in anisotropic, homogeneous ionized media. Due to a longitudinal, external magnetic field in incident signal will be split up into two circularly polarized modes, which propagate independently in the homogeneous medium. By means of the saddle-point method of integration approximate expressions for the transmitted signal in the medium have been obtained. These results have been used to calculate the distorted and time-delayed unit step modulated carrier and the distorted pulse-carrier in the layer in the isotropic as well as the anisotropic case. The split-up into a left-hand polarized and a right-hand polarized pulse is shown in a series of figures. (Author)
AD-668 455 HC$3.00 MF$0.65

COUPLED WAVE EQUATIONS FOR MULTI-MODE INHOMOGENEOUS MEDIA. II. SECTION A. ON THE TRANSFORMATION OF THE WAVE EQUATIONS OF AN INHOMOGENEOUS MULTI-WAVE SYSTEM TO COUPLED MODE FORM: SECTION B. ON INHOMOGENEOUS WAVE NUMBERS FOR LONGITUDINAL PROPAGATION IN A MAGNETO-IONIC MEDIUM,
Rydbeck Research Associates Fjaras (Sweden)
Ake G. Hjalmarson. Aug 67, 79p Rept no. Scientific-8
AFCRL-67-0644
Contract AF 61 (052)-864

Descriptors: (*Mechanical waves, Propagation), (*Transformations (Mathematics), *Harmonic analysis), Mathematical models, Theory, Matrix algebra, Differential equations, Mathematical analysis, Magnetic properties.
Identifiers: Partial waves, Inhomogeneous systems, Matrix formalism, Coupling theory.

By means of matrix formalism any linearized form of wave equations in total fields, which govern the propagation in an inhomogeneous multi-mode system can be transformed to coupled mode form. Various types of mode definition and coupled mode equations are obtained. The nature and properties of a mode definition depend upon the choice of original wave equations in total fields. Furthermore the modes can be defined by means of 'homogeneous' and 'inhomogeneous' models. The physical interpretation of the mode representation is a very important part of a coupling theory. To illuminate this situation the case of longitudinal propagation in an inhomogeneous magneto-ionic is treated by means of homogeneous and inhomogeneous mode representations. (Author)
AD-668 456 HC$3.00 MF$0.65

A CRITICAL STUDY OF THE POSSIBLE MODES OF PROPAGATION OF PI 2 MICROPULSATION ACTIVITY OVER THE EARTH'S SURFACE.
Royal Inst. of Tech., Stockholm (Sweden). Plasma Physics Div.
For primary bibliographic entry see Field 8N.
For abstract, see STAR 06 10.
N68-20227 HC$3.00 MF$0.65

21. PROPULSION AND FUELS

21B. Combustion and Ignition

CERTAIN PROBLEMS OF GAS DYNAMICS OF STREAMS IN TRANSVERSE FLOW DURING BURNING,
Foreign Technology Div Wright-Patterson AFB Ohio
V. A. Kosterin, E. V. Rzhevskii, and A. Ya. Khismatullin. 10 Oct 67, 16p Rept no. FTD-MT-24-303-67
Edited machine trans. of Izvestiya Vysshikh Uchebnykh Zavedenii. Aviatsionnaya Tekhnika (USSR), n1 p130-9 1966.

Descriptors: (*Combustion, Aerodynamic characteristics), (*Exhaust gases, Wake), Jet engines, Axially symmetric flow, Fuels, Air, Mixtures, Ignition, Combustion chambers, Combustion products, USSR.
Identifiers: Transverse flow, Gas dynamics, Translations.

Results of experimental investigation of gas dynamics of a wake forming behind a fan stream in transverse flow of a uniform fuel-air mixture during burning are given in the article. The field of speeds, temperatures and pressures are studied. Analysis is made of results of tests in the form of generalized dependencies, and a comparison is given with data obtained without burning in the wake after the fan stream and axisymmetrical bluff body. (Author)
AD-668 156 HC$3.00 MF$0.65

HEAT TRANSFER FROM A PROPANE-OXYGEN-ALUMINUM FLAME,
Waterloo Univ (Ontario) Dept of Mechanical Engineering
T. A. Brzustowski, A. G. McDonald, J. A. Newman, and R. Keshavan. 1967, 13p
Availability: Published in Pyrodynamics, v5 p203-15 1967.

Descriptors: (*Flames, Heat transfer), (*Aluminum, Combustion), Fuels, Propanes, Oxidizers, Oxygen, Additives, Powder metals, Alumina, Films, Thermal insulation, Thermal radiation, Canada.
Identifiers: Oxide films.

Experimental studies were performed on a propane-oxygen flame at 1 atm seeded with Al to determine the global characteristics of Al-seeded flames, particularly the mechanism of heat transfer to a solid surface immersed in the flame. Two stable and reproducible flames were studied: one seeded with 8.2% Al by weight, and the other with 13.7% Al. Heat transfer rates to a cooled flat plate were measured as a function of distance along the flame. The plate was mounted parallel to the flame axis and was outside the central core in which the Al powder burned. Measurements were made at the same plate position for both seeded and unseeded flames. Data for both flames were correlat-

ed by the same equation containing only aerodynamic parameters and a constant which took one value for the seeded flames and another value for the unseeded flames. Thermal radiation from the flame appears to originate mainly from hot aluminum oxide particles outside the A1-O2 reaction zone. Aluminum oxide deposited on a solid surface immersed in the flame reflects thermal radiation and, when sufficiently thick, acts as an insulating layer. (Author)
AD-668 270 Not available from CFSTI.

GAS TURBINE CYCLE CALCULATIONS: DIFFERENTIAL METHODS IN THE ANALYSIS OF EQUILIBRIUM OPERATION,
National Research Council of Canada, Ottawa (Ontario). Div. of Mechanical Engineering.
For primary bibliographic entry see Field 21E.
AD-820 539 HC$3.00 MF$0.65

PRESSURE SWITCH FOR DETECTION OF THRUSTER OPERATION OF LUNAR EXCURSION MODULE REACTION CONTROL SYSTEM FINAL REPORT.
Electro-optical Systems, Inc., Pasadena, Calif.
For primary bibliographic entry see Field 21H.
For abstract, see STAR 06 10.
N68-19701 HC$3.00 MF$0.65

STATISTICAL DERIVATION OF DESIGN CRITERIA FOR LIQUID ROCKET COMBUSTION INSTABILITY FINAL REPORT.
Little (Arthur D.), Inc., Cambridge, Mass.
For primary bibliographic entry see Field 21H.
For abstract, see STAR 06 10.
N68-19744 HC$3.00 MF$0.65

EXPLORING IN AEROSPACE ROCKETRY. 4 - THERMODYNAMICS.
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
For primary bibliographic entry see Field 21I.
For abstract, see STAR 06 10.
N68-19840 HC$3.00 MF$0.65

SOME ASPECTS OF STEADY-STATE PROPELLANT COMBUSTION AS RELATED TO DYNAMIC COUPLING MECHANISMS.
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
L. A. Povinelli. 1968, 12p NASA-TM-X-52419
Refs Conf- Presented At Conf. on Mech. of Coupling of Combust. With Gas Dyn. Flow Fields, Princeton Univ., N. J., 25-26 Jan. 1968

Descriptors: *Coupling, *Propellant combustion, *Solid propellants, Diffusion, Dynamic response, Flow velocity, Thickness.

For abstract, see STAR 06 10.
N68-20042 HC$3.00 MF$0.65

REVIEW OF THE STATE OF THE ART AND TECHNOLOGICAL PROGRESS IN THE FIELD OF HYBRID PROPELLANTS.
Office National D Etudes Et de Recherches Aerospatiales, Paris (France).
For primary bibliographic entry see Field 21I.
For abstract, see STAR 06 10.
N68-20321 HC$3.00 MF$0.65

21C. Electric Propulsion

DIRECT CONVERSION OF VARIOUS FORMS OF ENERGY INTO ELECTRIC AND MECHANICAL POWER,
Foreign Technology Div Wright-Patterson AFB Ohio
For primary bibliographic entry see Field 10A.
AD-668 263 HC$3.00 MF$0.65

OUT OF THE ECLIPTIC PLANE PROBE MISSION EMPLOYING ELECTRIC PROPULSION.
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
F. J. Hrach. Apr 68, 35p NASA-TN-D-4455
Contract 120-26-07-01-22

Descriptors: *Agena rocket vehicles, *Atlas launch vehicles, *Centaur launch vehicle, *Ecliptic, Electric propulsion, Escape velocity, Solar activity, Solar orbits, Space missions, Sun, Trajectory analysis.

For abstract, see STAR 06 10.
N68-19581 HC$3.00 MF$0.65

EXPLORING IN AEROSPACE ROCKETRY. 20 - ELECTRIC PROPULSION.
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
H. Kaufman. 1968, 24p NASA-TM-X-52407
Conf- Presented At the Lewis Aerospace Explorers Conf., Cleveland, 1966-1967

Descriptors: *Electric propulsion, *Electric rocket engines, *Rocket engine design, Electromagnetic propulsion, Electrothermal engines, Gravitational effects, Space missions, Turbogenerators.

For abstract, see STAR 06 10.
N68-19832 HC$3.00 MF$0.65

HIGH-TEMPERATURE LM CATHODES FOR ION THRUSTERS SUMMARY REPORT, 1 JUN. 1966 - 31 JUL. 1967.
Hughes Research Labs., Malibu, Calif.
K. W. Arnold, W. O. Eckhardt, G. Hagen, J. Hyman, Jr., and R. C. Knechtli. 31 Jul 67, 73p NASA-CR-93771
Contract NASW-1404

Descriptors: *Cathodes, *Ion engines, *Liquid metals, *Performance tests, Electron emission, Mercury (metal), Rocket engines, Surface temperature.

For abstract, see STAR 06 10.
N68-20121 HC$3.00 MF$0.65

DIVERGENT-FLOW CONTACT-IONIZATION ELECTROSTATIC THRUSTOR FOR SATELLITE ATTITUDE CONTROL AND STATION KEEPING.
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
W. C. Lathem, and J. F. Staggs. Apr 68, 25p NASA-TN-D-4420
Contract 120-26-02-06-22

Descriptors: *Electrostatic engines, *Rocket engines, *Satellite attitude control, *Stationkeeping, Beam currents, Convergence, Critical temperature, Current density, Deflection, Divergence, Electrostatic propulsion, Fluid flow, Ion beams, Thrust vector control.

For abstract, see STAR 06 10.
N68-20187 HC$3.00 MF$0.65

21D. Fuels

FEASIBILITY OF BURNING EMULSIFIED FUEL IN A 7LM100 ENGINE,
General Electric Co Cincinnati Ohio Flight Propulsion Div
W. W. Stockton, and C. M. Olsen. Feb 68, 72p USAAVLABS-TR-67-74
Contract DAAJ02-67-C-0038

Descriptors: (*Jet engine fuels, Gels), (*Gas turbines, Jet engine fuels), Storage, Safety, Flammability, Ignition, Performance (Engineering), Fuel nozzles, Fouling, Combustion products, Deposits, Compatibility, Feasibility studies.
Identifiers: *Gelled fuels, LM-100 engines, JP-4 fuels.

Investigations were undertaken for the purpose of developing a 'safe' fuel that will not explode in its stored condition when exposed to a spark, but which will give identical engine performance when used in place of fuels being burned today. The Bell air cushion ,vehicle engine, a General Electric M100, was tested on the latest emulsified 'safe' JP-4 fuel. Engine starts and operation were about the same with emulsified JP-4 fuel as with plain JP-4 except that running time was limited on emulsified fuel because of fuel nozzle clogging. Clogging was caused by dirtier-than-normal fuel and by an iron deposit that formed on the fuel nozzles and fuel nozzle screens. (Author)
AD-667 902 HC$3.00 MF$0.65

A NEW PETROLEUM AND NATURAL GAS SUBMODEL OF THE PARM PROTOTYPE MODEL.
Technical rept.,
National Resource Analysis Center Washington D C
Ellenora P. Rosenberg. Jan 68, 25p Rept no. NRAC-TR-68

Descriptors: (*Petroleum industry, Game theory), Disasters, Nuclear warfare, Civil defense systems, Refineries, National defense, Models (Simulations), Fuels, Military requirements, Civil engineering, Management planning.
Identifiers: PARM (Post Attack Resource Management), Emergency planning, *Post attack resource management.

The report describes the formulation of a new petroleum and gas submodel which has been implemented in the PARM prototype model. (Author)
AD-667 984 HC$3.00 MF$0.65

METHOD OF APPRAISING THERMAL STABILITY OF FUELS UNDER DYNAMIC CONDITIONS (COLLECTION OF ARTICLES),
Foreign Technology Div Wright-Patterson AFB Ohio
E. R. Tereshchenko, B. D. Zaloga, and S. M. Maksimov. 1 May 67, 156p Rept no. FTD-MT-66-99
Edited machine trans. of mono. Metody Otsenki Ekspluatatsionnykh Svoistv Reaktivnykh Topliv i Smazochnykh Materialov. Sbornik Statei, Moscow, 1966 p1-131.

Descriptors: (*Aviation fuels, Thermal stability), (*Lubricants, Thermal stability), Jet engine fuels, Test methods, Combustion chambers, Combustion, Combustion deposits, Fuel additives, Antioxidants, Vapor pressure, Fuel tanks, Evaporation, Gas analysis, Airplane engine oils, Greases, Ignition, USSR.
Identifiers: Translations.

Contents: Method of appraising jet propellants in a small combustion chamber of a turbojet engine; Method of appraising the burning characteristics of hydrocarbon fuels in a chamber type burner; Methods of appraising thermal stability of jet fuels; Method of appraising thermal stability of fuels under dynamic conditions; Determining thermal stability of fuels in a rocking autoclave; Determining the pressure of saturated hydrocarbon fuel vapor; Determining the volatility of hydrocarbon fuels at low pressures; Determining the pressure of saturated vapors of fuels on a diaphragm instrument; Methods of appraising fuel losses due to evaporation in aircraft tanks; Determining nonstationary solubility of gas in hydrocarbon fuels; Instrument for determining the quantity of gas dissolved in a liquid; A method of appraising the thermooxidizing stability of aviation oils at raised temperatures; Determining thermal stability of lubricating greases; Method of appraising the lubricating ability of high-temperature lubricants in a wide range of temperatures; Appraising the efficiency

of grease lubricants in ball bearings; Methods of determining the temperature of self-ignition of oils.
AD-668 115 HC$3.00 MF$0.65

21E. Jet and Gas Turbine Engines

INVESTIGATIONS OF A VARIABLE AREA SCROLL FOR POWER TRANSFER IN TIP TURBINE LIFT FAN SYSTEMS.
Final rept. Jun 64-Dec 66,
General Electric Co Cincinnati Ohio Flight Propulsion Div
Eugene G. Smith. Nov 67, 623p
USAAVLABS-TR-67-26
Contract DA-44-177-AMC-220 (T)

Descriptors: (*Vertical take-off planes, *Gas turbines), (*Variable area nozzles, *Stabilization systems), Performance (Engineering), Axial-flow turbines, Gas generating systems, Flight control systems, Analog computers, Simulation, Roll, Materials, Design, Turbine wheels, Gas turbine rotors, Stresses, Analog systems, Aerodynamic characteristics.
Identifiers: *Tip turbines, *Lift fans, V-5 aircraft, XV-5A aircraft, X353-5A fans, LF2 rotors, J-85 Engines, YJ85-GE-5 Engines, Jazzers, Variable area scrolls, *Power transfer systems.

Demonstration tests and analog simulations were performed for the variable area scroll power transfer applicable for thrust control of tip turbine driven lift fans. The tip turbine driven lift fan used the lightweight LF2 rotor. Control response rates of 0.31 second for roll control and 0.10 second for height control were demonstrated. The jazzer, an anticipatory device, improved the response to about one-half the original level. Aerodynamic performance of the system met or exceeded objective levels. (Author)
AD-667 989 HC$3.00 MF$0.65

SLIPPING STALL,
Foreign Technology Div Wright-Patterson AFB Ohio
A. I. Pryadilov. 18 Aug 67, 17p Rept no. FTD-MT-24-175-67
Edited machine trans. of Izvestiya Vysshikh Zavedenii. Energetika (USSR), n5 p67-75 1963.

Descriptors: (*Axial-flow compressors, *Stalling), Axial-flow compressor blades, Performance (Engineering), Angle of attack, Lift, Rotation, Gas flow, Velocity, Aerodynamic characteristics, USSR.
Identifiers: *Slipping stall, Translations.

Phenomena are described of a 'slipping' blade-tip stall in an axial 100%-reaction compressor. The slipping stall is defined as a series of adjacent local stalls that arise when dP/d alpha becomes negative, where P is the lift force and alpha is the angle of attack. A gas leakage scheme in the stalling zone is considered, and formulas that describe the stall are developed. It is found that: (1) The rotating slipping stall is a self-oscillatory process whose energy is taken from the compressed gas; (2) The stall is caused by a sudden change in gas-flow conditions at the runner blades; (3) The analysis presented in the article permits evaluating, in the first approximation, the effect of runner rpm upon the speed of stalling and upon the flow-pulsation amplitude with a constant throttle resistance. (Author)
AD-668 110 HC$3.00 MF$0.65

INVESTIGATION OF CHANNEL VANED DIFFUSER OF CENTRIFUGAL COMPRESSOR UNDER VARIABLE CONDITIONS,
Foreign Technology Div Wright-Patterson AFB Ohio
N. N. Bukharin. 4 Aug 67, 24p Rept no. FTD-MT-24-122-67
Edited machine trans. of Politekhnicheskii Institut, Leningrad. Trudy (USSR), n247 p75-85 1965.

Descriptors: (*Centrifugal compressors, *Diffusers), Impellers, Efficiency, Duct inlets, Jet engines, Cascade structures, Aerodynamic configurations, Drag, Stability, USSR.
Identifiers: Translations.

In centrifugal high-pressure compressors, considerable losses occur in the vaned or ducted diffusor for transforming kinetic into potential energy which is located directly behind the impeller. These losses considerably lower diffusor efficiency. Analysis of the effect of the diffusor geometry on its efficiency was made. It was concluded that minimum losses in the ducts of a vaned diffusor occur at minimum flow rates, while minimum losses in the flow through the impeller occur at maximum flow rates. The diffusor should therefore be designed to minimize the overall losses in both elements. (Author)
AD-668 113 HC$3.00 MF$0.65

CERTAIN PROBLEMS OF GAS DYNAMICS OF STREAMS IN TRANSVERSE FLOW DURING BURNING,
Foreign Technology Div Wright-Patterson AFB Ohio
For primary bibliographic entry see Field 21B.
AD-668 156 HC$3.00 MF$0.65

INVESTIGATION AND ANALYSIS OF AIRCRAFT FUEL EMULSIONS.
Final rept. 15 Jun 66-14 Jun 67,
Monsanto Research Corp Dayton Ohio Dayton Lab
Jay C. Harris, and Edward A. Steinmetz. Dec 67, 196p
USAAVLABS-TR-67-70
Contract DA-44-177-AMC-445 (T)

Descriptors: (*Jet engine fuels, *Gels), Fire safety, Surface-active substances, Thermal stability, Flammability, Fluid flow, Evaporation, Calorimetry, Compatibility, Corrosion, Lubrication, Static electricity, Biological contamination, Mass transfer, Production, Storage.
Identifiers: *Gelled fuels, JP-4 fuels.

The objective of this contract was the development of flammability-controlled JP-4 emulsions for use in gas turbine engines and recovery of JP-4 from the emulsified fuel for forward base usage. The emulsion produced reduced the flame propagation rate to 1/87th that of JP-4 and reduced the area of dynamic burning to 1/6th that of JP-4. Other flame and explosivity tests also showed lower flammability. Tests with metals and elastomers used in fuel systems showed negligible or low emulsion effect. Lubricity tests showed the emulsion to have a coefficient of friction considerably lower than JP-4 alone. Negligible static charge buildup and high conductivity significantly lowered this potential hazard for the emulsion. Although the emulsion can be pumped satisfactorily, it does not flow freely to a sump. The emulsion can very readily be broken chemically: The raw recovered JP-4 contains the emulsifier which can be removed quantitatively by filtration through a column of attapulgite clay. Emulsion partially broken by thermal extremes or by multipassage through a centrifugal pump can be reconstituted by mild agitation. (Author)
AD-668 248 HC$3.00 MF$0.65

EFFECTIVENESS OF AN INERTIAL AIR CLEANER IN EXTENDING GAS TURBINE LIFE IN A DUSTY ENVIRONMENT.
Technical rept. (Final),
Southwest Research Inst San Antonio Tex Dept of Automotive Research
Gary E. Thomas. Mar 68, 58p Rept no. SwRI-AR-643
Contract DAAK02-68-C-0007

Descriptors: (*Gas turbines, Ingestion (Engines)), (*Air intake filters, Performance (Engineering)), Dust, Life expectancy, Erosion, Soils, Engine air systems components, Effectiveness, Controlled atmospheres, Aircraft engines.
Identifiers: Turbine/generator sets, *Cyclonic air cleaners.

Two 60 kw gas turbine driven generator sets were operated simultaneously at rated load in a controlled dusty environment. One of the units was protected with an inertial type air cleaner; the other was unprotected. The objective of the test was to provide a basis for determining the level of air inlet protection required for small general purpose military gas turbine engines. The investigation demonstrated that useful life of a gas turbine can be significantly extended with the application of a commercially available inertial type air cleaner and that turbine parts can be severely damaged by small concentrations of dust particles less than 10 - 20 microns in size. It also appears possible that some life improvement can be achieved through materials selection for certain components. (Author)
AD-668 258 HC$3.00 MF$0.65

CALCULATION OF THE WORKING PROCESS IN A COOLED GAS TURBINE,
Foreign Technology Div Wright-Patterson AFB Ohio
G. S. Saprykin. 16 Jun 67, 23p Rept no. FTD-MT-67-63
Edited machine trans. of Izvestiya Vysshikh Uchebnykh Zavedenii. Energetika (USSR) n6 p53-62 1966.

Descriptors: (*Gas turbines, Performance (Engineering)), Thermodynamics, Cooling, Design, Axial-flow turbines, Energy, Heat transfer, Mathematical analysis, Efficiency, USSR.
Identifiers: Translations.

An analytical method is presented for calculating the gas expansion in a cooled gas turbine and for determining the energy losses due to cooling. Formulas are derived which make it possible to determine the actual work, inlet and exit gas temperatures, and the amount of heat lost to cooling. The formulas are sufficiently accurate and are recommended for the analysis and selection of cycle parameters and for designing power plants with high temperature gas turbines. (Author)
AD-668 294 HC$3.00 MF$0.65

VORTEX EFFECTS IN A TURBINE STAGE,
Foreign Technology Div Wright-Patterson AFB Ohio
M. E. Deich, and E. E. Likherzak. 9 Jun 67, 18p Rept no. FTD-MT-67-47
Edited machine trans. of Akademiya Nauk SSSR. Izvestiya. Energetika i Transport, n1 p109-15 1964.

Descriptors: (*Gas turbines, Vortices), (*Axial-flow turbines, Vortices), Thermodynamics, Stagnation point, Gas flow, Turbulence, Distribution, Two-dimensional flow, Axially symmetric flow, Nozzle gas flow, Adiabatic gas flow, Prandtl number, Approximation (Mathematics), USSR.
Identifiers: Translations.

Experimental and calculated relationships characterizing the uneven distribution of stagnation temperatures in the viscous gas behind the vane grid of a turbine are presented. Evaluation of turbulent effects in a turbine is carried out to achieve better understanding of the actual structure (thermal and dynamic) of turbine flow. Two related problems arise in calculation of the uneven distribution of stagnation temperatures through the radius of a stage. The first problem is that of determining the method of calculation, permitting an approximation of the magnitude of the specified nonuniformity which is dependent on basic modes and geometrical parameters of a stage. The second is the insertion of related correction into the aerodynamic calculation of flow turbulence. By experimenting, several preliminary appraisals of the energy distri-

bution behind the axial-type vane grid are made. The method proposed for evaluating stagnation temperature inhomogeneity in the nozzle grid is found entirely approximate and its error must be tested thoroughly with experiments. When experimenting with grids and high-spin stages with large M numbers, it is necessary to measure the stagnation temperature in the gap and behind the stage. (Author)
AD-668 511 HC$3.00 MF$0.65

GAS TURBINE CYCLE CALCULATIONS: DIFFERENTIAL METHODS IN THE ANALYSIS OF EQUILIBRIUM OPERATION,
National Research Council of Canada, Ottawa (Ontario). Div. of Mechanical Engineering.
E. P. Cockshutt. Mar 67, 61p
NRC-9666, NAE-LR-481

Descriptors: (*Turbojet engines, Combustion), (*Combustion, Thermodynamics), Mathematical analysis, Captive tests, Axial-flow compressors, Axial-flow turbines, Specific heat, Burning rate, Jet engine fuels, Thrust, Fuel consumption, Jet engine inlets, Performance (Engineering), Design, Mathematical models, Response, Environment, Differential equations, Linear systems, Nozzle area ratio, Nozzle throats, Jet mixing flow, Nozzle gas flow, Canada.

The equilibrium operation of a simple turbojet engine is analyzed, using logarithmic differential methods to infer performance changes about a design point. A simple method, assuming constant specific heats and ignoring mass addition effects, is compared with a more rigorous analysis where both these effects are considered; it is shown that the computation of fuel flow, at least, should follow the rigorous analysis. The application of the analysis is illustrated by considering the performance response of a turbojet engine as the air flow is reduced. The effects of simple mass flow change and simple compressor efficiency change are considered separately, and superposition to determine the combined result is illustrated. Extensive changes of cycle parameters and component efficiencies are shown to have only small changes on engine thrust and sfc response; somewhat stronger effects are associated with changing the engine flight condition. (Author)
AD-820 539 HC$3.00 MF$0.65

HELICOPTER GAS TURBINE ENGINE,
Joint Publications Research Service, Washington, D. C.
M. M. Maslennikov, A. F. Savostin, A. M. Tikhonov, Yu. I. Dobryakov, and Yu. I. Shalman. 24 Jan 68, 109p
Trans. of mono. Vertoletnye Gazoturbinnye Dvigateli, Moscow, 1966 p5-35, 90-111, 163-99.

Descriptors: (*Helicopter engines, *Gas turbines), Gas turbine rotors, Drives, Wear resistance, Performance (Engineering), Axial-flow compressors, Axial-flow turbines, Air pollution, Dust, Gas turbine regenerators, Thermodynamics, USSR.

Contents: Use of heat regeneration and elevated gas temperatures in helicopter gas turbine engines; Some characteristics of helicopter powerplants with direct turbine drive of main rotor; Wear and performance variation of axial and centrifugal compressor stages operating in dusty air.
JPRS-44128 HC$3.00 MF$0.65

PERFORMANCE AND ANALYSIS OF SEALS FOR INERTED LUBRICATION SYSTEMS OF TURBINE ENGINES.
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
For primary bibliographic entry see Field 11A.
For abstract, see STAR 06 10.
N68-19861 HC$3.00 MF$0.65

ANALYSIS OF GEOMETRY AND DESIGN POINT PERFORMANCE OF AXIAL FLOW TURBINES. PART 3 - DESIGN ANALYSIS OF SELECTED EXAMPLES FINAL REPORT.
Northern Research and Engineering Corp., Cambridge, Mass.
For primary bibliographic entry see Field 10A.
For abstract, see STAR 06 10.
N68-19929 HC$3.00 MF$0.65

ANALYTICAL INVESTIGATION OF SUPERSONIC TURBOMACHINERY BLADING. 2 - ANALYSIS OF IMPULSE TURBINE-BLADE SECTIONS.
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
L. J. Goldman. Apr 68, 23p NASA-TN-D-4422
Contract 128-31-02-25-22

Descriptors: *Spacecraft power supplies, *Supersonic turbines, *Systems engineering, *Turbine blades, Flow geometry, Inlet flow, Specific heat, Supersonic flow, Surface geometry.

For abstract, see STAR 06 10.
N68-20276 HC$3.00 MF$0.65

OUTLINE OF PLAN FOR ENGINEERING STUDIES REFERENCE PLANT CYCLE SELECTION AND SELECTION OF PLANT STEAM CONDITIONS.
Newport News Shipbuilding and Dry Dock Co., Va. Engineering Technical Dept.
For primary bibliographic entry see Field 13J.
PB-177 849 HC$3.00 MF$0.65

PRELIMINARY PLANT DESIGN STUDY AND COMPONENT SELECTION.
Newport News Shipbuilding and Dry Dock Co., Va. Engineering Technical Dept.
For primary bibliographic entry see Field 13J.
PB-177 850 HC$3.00 MF$0.65

MAIN PLANT CONTROL SYSTEM.
Newport News Shipbuilding and Dry Dock Co., Va. Engineering Technical Dept.
For primary bibliographic entry see Field 13J.
PB-177 851 HC$3.00 MF$0.65

PRELIMINARY OVERALL PLANT DESIGN SELECTION.
Newport News Shipbuilding and Dry Dock Co., Va.
For primary bibliographic entry see Field 13J.
PB-177 852 HC$3.00 MF$0.65

DEVELOPMENT OF FINAL DETAILED STEAM PLANT HEAT BALANCE AND COMPONENT SELECTION.
Newport News Shipbuilding and Dry Dock Co., Va. Engineering Technical Dept.
For primary bibliographic entry see Field 13J.
PB-177 853 HC$3.00 MF$0.65

FINAL CONTROL SELECTION.
Newport News Shipbuilding and Dry Dock Co., Va. Engineering Technical Dept.
For primary bibliographic entry see Field 13J.
PB-177 854 HC$3.00 MF$0.65

CASUALTY ANALYSIS, MANNING ANALYSIS AND MACHINERY SPACE ARRANGEMENTS.
Newport News Shipbuilding and Dry Dock Co., Va. Engineering Technical Dept.
For primary bibliographic entry see Field 13J.
PB-177 855 HC$3.00 MF$0.65

SUMMARY REPORT.
Newport News Shipbuilding and Dry Dock Co., Va. Engineering Technical Dept.
For primary bibliographic entry see Field 13J.
PB-177 856 HC$3.00 MF$0.65

OUTLINE SPECIFICATIONS.
Newport News Shipbuilding and Dry Dock Co., Va. Engineering Technical Dept.
For primary bibliographic entry see Field 13J.
PB-177 857 HC$3.00 MF$0.65

INTEGRATED GAS TURBINE POWER PLANT DESIGN STUDY.
General Electric Co., Schenectady, N. Y.
For primary bibliographic entry see Field 13J.
PB-177 858 HC$3.00 MF$0.65

INTEGRATED GAS TURBINE POWER PLANT.
Pratt and Whitney Aircraft, East Hartford, Conn.
For primary bibliographic entry see Field 13J.
PB-177 862 HC$3.00 MF$0.65

21F. Nuclear Propulsion

EFFECT OF COVER GAS PRESSURES ON ACCELERATED CAVITATION DAMAGE.
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
For primary bibliographic entry see Field 11F.
For abstract, see STAR 06 10.
N68-19745 HC$3.00 MF$0.65

EXPLORING IN AEROSPACE ROCKETRY. 19 - NUCLEAR ROCKETS.
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
A. F. Lietzke. 1968, 16p NASA-TM-X-52406
Conf- Presented At Lewis Aerospace Explorers Conf., Cleveland, 1966-1967

Descriptors: *Fast nuclear reactors, *Nuclear fuels, *Nuclear propulsion, *Nuclear rocket engines, Atomic collisions, Chemical propulsion, Fission, Neutron scattering, Plutonium, Uranium.

For abstract, see STAR 06 10.
N68-19830 HC$3.00 MF$0.65

21G. Reciprocating Engines

FAIRBANKS MORSE ADVANCED DESIGN MOTOR SHIP MACHINERY PLANT 20,000 SHP.
Fairbanks, Morse and Co., Beloit, Wis.
For primary bibliographic entry see Field 13J.
PB-177 860 HC$3.00 MF$0.65

20,000 SHP ADVANCED DIESEL PLANT. APPENDIX I - APPENDIX XII.
Fairbanks, Morse and Co., Beloit, Wis.
For primary bibliographic entry see Field 13J.
PB-177 861 HC$3.00 MF$0.65

21H. Rocket Motors and Engines

EXPERIMENTAL INVESTIGATION OF A TRIPLE-JET GAS EJECTOR,
Foreign Technology Div Wright-Patterson AFB Ohio
Yu. N. Vasilev, Yu. A. Zhuravlev, and V. A. Konotop. 4 Oct 67, 19p Rept no. FTD-MT-24-164-67
Edited machine trans. of Lopatochnye Mashiny i Struynye Apparaty (USSR), n1 p217-34 1966.

Descriptors: (*Rocket motor nozzles, Performance (Engineering)), Jets, Efficiency, Annular nozzles, Nozzle gas flow, Pressure, USSR, Convergent divergent nozzles, Jet mixing flow.
Identifiers: Compression ratio, Translations.

An experimental study was made of a three-jet gas ejector in an attempt to improve ejector efficiency. The three-jet ejector consists of a converging nozzle for the high pressure gas and an annular nozzle for the low-pressure gas, and is similar to a conventional ejector; it is, however, also equipped with

a tube in the center of the converging nozzle through which part of the low-pressure gas is introduced. Plots were obtained for the dependence of the compression ratio on the pressure drop in the forechamber, at various positions of the central tube, and with the converging nozzles having diameter ratios of 0.55, 0.45, and 0.35. The results showed that a compression ratio of 31 and a pressure drop of 240 can be obtained in the three-jet ejector when the outlet of the central tube is located in the minimum pressure zone. This compares very favorably with the 5.6 and 42.5 values obtained in a conventional ejector. By using a start-up control in which the central tube outlet is gradually moved into the minimum pressure zone, a compression ratio of 44 and a pressure drop of 340 can be obtained. The overall results indicate that the operation of a conventional ejector can be substantially improved by installing a central tube for the low-pressure gas. (Author)
AD-668 118 HC$3.00 MF$0.65

EVALUATION OF PERFORMANCE CHARACTERISTICS OF A HIGH CHAMBER PRESSURE OXIDIZER-RICH STAGED COMBUSTION GAS GENERATOR.
Technical memo.,
Purdue Univ Lafayette Ind Jet Propulsion Center
R. L. Strickler, and C. F. Warner. Feb 68, 189p
Rept nos. TM-68-1, JPC-442
Contract Nonr-1100 (21)

Descriptors: (*Rocket motors (Liquid propellant), *Injectors), (*Combustion chambers, Performance (Engineering)), Gas generating systems, Liquid rocket oxidizers, Hypergolic rocket propellants, Nitrogen oxides, Hydrazine, Dimethyl hydrazine (1-1), Nozzles, Turbopumps, Thrust vector control systems, Configuration, Combustion, Stagnation point, Pressure.

The report describes an experimental investigation of the effects of high stagnation pressures, extremely oxidizer-rich mixture ratios, and various injector configurations on the performance characteristics of a liquid rocket combustor. These environmental conditions can be encountered in the propulsion gas supply for turbopump assemblies on liquid rocket propulsion systems, auxiliary power sources, or working fluid supply on thrust vector control systems. The storable, hypergolic propellants nitrogen tetroxide and a 50-50 mixture by weight of hydrazine and unsymmetrical dimethylhydrazine were selected for investigation. The experimental combustor consisted of a liquid propellant injector, combustion chamber, combustion chamber extensions, combustion gas mixing ring, and nozzle. Four different injectors, all of the liquid-liquid unlike impingement type, were employed in the investigation to examine the performance dependence on droplet size and injector configuration. Stagnation pressures were varied from 1050 psi to 3650 psi. The possible chemical kinetic effects on performance were isolated by varying the mixture ratio from 13 to 24 and employing combustors with significant changes in length. (Author)
AD-668 493 HC$3.00 MF$0.65

PRESSURE SWITCH FOR DETECTION OF THRUSTER OPERATION OF LUNAR EXCURSION MODULE REACTION CONTROL SYSTEM FINAL REPORT.
Electro-optical Systems, Inc., Pasadena, Calif.
J. Delmonte. 10 May 67, 141p NASA-CR-93767, EOS-7127-FINAL
Contract NAS9-6409

Descriptors: *Combustion control, *Lunar module, *Pressure sensors, Acceleration (physics), Electronic transducers, Pressure regulators, Rocket engine control, Switching circuits, Thrust control.

For abstract, see STAR 06 10.
N68-19701 HC$3.00 MF$0.65

EXPERIMENTAL EVALUATION OF SEVERAL ADVANCED ABLATIVE MATERIALS AS NOZZLE SECTIONS OF A STORABLE-PROPELLANT ROCKET ENGINE.
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
A. J. Pavli. Apr 68, 23p NASA-TM-X-1559
Contract 128-31-03-00-22

Descriptors: *Ablative materials, *Erosion, *Rocket engines, *Storable propellants, Corrosion resistance, Nozzle walls, Phenolic resins, Reinforcement, Test firing.

For abstract, see STAR 06 10.
N68-19708 HC$3.00 MF$0.65

STATISTICAL DERIVATION OF DESIGN CRITERIA FOR LIQUID ROCKET COMBUSTION INSTABILITY FINAL REPORT.
Little (Arthur D.), Inc., Cambridge, Mass.
E. K. Bastress, G. H. Harris, and I. Miller. Dec 67, 135p NASA-CR-72370
Contract NASW-1236

Descriptors: *Combustion stability, *Engine design, *Liquid propellant rocket engines, *Statistical correlation, *Structural analysis, Data processing, Dynamic characteristics, Performance tests.

For abstract, see STAR 06 10.
N68-19744 HC$3.00 MF$0.65

EXPLORING IN AEROSPACE ROCKETRY. 6 - SOLID-PROPELLANT ROCKET SYSTEMS.
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
J. F. Mc Bride. 1968, 20p NASA-TM-X-52393
Conf- Presented At the Lewis Aerospace Explorers, Cleveland, 1966-1967

Descriptors: *Burning rate, *Combustion efficiency, *Solid propellant rocket engines, *Solid rocket propellants, Control rockets, Igniters, Nozzle efficiency, Propellant grains, Rocket engine cases, Thermal insulation.

For abstract, see STAR 06 10.
N68-19831 HC$3.00 MF$0.65

EXPLORING IN AEROSPACE ROCKETRY. 5 - MATERIALS.
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
W. D. Klopp. 1968, 20p NASA-TM-X-52392
Conf- Presented At the Lewis Aerospace Explorers Conf., Cleveland, 1966-1967

Descriptors: *Ablative materials, *Refractory metals, *Rocket engines, *Spacecraft propulsion, Combustion chambers, Crack propagation, Cryogenic rocket propellants, Heat resistant alloys, Nozzle efficiency, Rocket engine cases.

For abstract, see STAR 06 10.
N68-19833 HC$3.00 MF$0.65

EXPLORING IN AEROSPACE ROCKETRY. 2 - PROPULSION FUNDAMENTALS.
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
J. F. Connors. 1968, 19p NASA-TM-X-52389
Refs Conf- Presented At Lewis Aerospace Explorers Conf., Cleveland, 1966-1967

Descriptors: *Newton second law, *Rocket engine design, *Spacecraft propulsion, *Thrust loads, Exhaust velocity, Nozzle flow, Nozzle geometry, Propulsive efficiency, Rocket engines.

For abstract, see STAR 06 10.
N68-19834 HC$3.00 MF$0.65

DETERMINATION OF THERMOPHYSICAL PROPERTIES OF ABLATIVE MATERIALS. PHASE 1 - LABORATORY DETERMINATIONS. PART B - THERMAL CONDUCTIVITY AND THERMAL DIFFUSIVITY.
TW Systems, Redondo Beach, Calif.
G. B. Charlan, R. D. Larson, and R. C. Nordberg. 16 Jan 67, 38p NASA-CR-92018, TRW-04812-6001-R001, PT. B
Contract NAS9-4518

Descriptors: *Ablative materials, *Apollo spacecraft, *Propulsion system configurations, *Thermophysical properties, Pyrolytic materials, Temperature measurement, Thermal conductivity, Thermal diffusion.

For abstract, see STAR 06 10.
N68-19863 HC$3.00 MF$0.65

EXPERIMENTAL INVESTIGATION OF REACTION CONTROL, STORABLE BIPROPELLANT THRUSTORS.
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
R. J. Rollbuhler. Apr 68, 35p NASA-TN-D-4416
Contract 128-31-20-50-22

Descriptors: *Low thrust propulsion, *Performance tests, *Propellant storability, *Thrust vector control, Hydrazines, Nitrogen tetroxide, Rocket engines, Spacecraft control.

For abstract, see STAR 06 10.
N68-20064 HC$3.00 MF$0.65

SCALE 1/14.2 INVESTIGATION OF SUBMERGED NOZZLE FOR SL-3 260-INCH SOLID ROCKET.
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
J. J. Pelouch, Jr., and R. J. Salmi. Apr 68, 12p NASA-TM-X-1546
Refs Conf- Presented At the 2d Aiaa-icrpg Solid Propellant Conf., Anaheim, Calif., Jun. 1967

Descriptors: *Nozzle design, *Solid propellant rocket engines, Convergent-divergent nozzles, Erosion, Exhaust gases, Thermal protection.

For abstract, see STAR 06 10.
N68-20186 HC$3.00 MF$0.65

ELDO FUTURE PROGRAMS - A PRELIMINARY STUDY OF THE PERFORMANCE AND DESIGN OF APOGEE MOTOR STAGES FOR THE ELDO 'A' LAUNCHING VEHICLE.
Royal Aircraft Establishment, Farnborough (England). Space Dept.
Mar 64, 121p RAE/SPA/L/C.917
Seri- Its Preliminary Study No. 1.1 Prep- Prepared for Eldo

Descriptors: *Eldo launch vehicle, Apogees, Costs, Engine design, Error analysis, Gyrostabilizers, Liquid propellant rocket engines, Propulsion system performance, Solid propellant rocket engines, Spin stabilization.

For abstract, see STAR 06 10.
N68-20266 HC$3.00 MF$0.65

HIGH ENERGY UPPER STAGES FOR ELDO VEHICLES.
Hawker Siddeley Dynamics, Ltd., Stevenage (England). Space Div.
G. W. Childs, and D. Stott. 1967, 38p ELDO/SP/67/-6
Conf- Presented At the Eldo Symp. on Propulsion, Paris, 10-12 Oct. 1967 Subm- Submitted for Publication

Descriptors: *Eldo launch vehicle, *High energy propellants, *Hydrogen oxygen engines, *Liquid propellant rocket engines, Launch vehicle configurations, Liquid hydrogen, Liquid rocket propellants, Performance tests, Propulsion system configurations, Propulsive efficiency.

For abstract, see STAR 06 10.
N68-20307 HC$3.00 MF$0.65

ADVANCED HYBRID PROPELLANTS.
Systemes Hybrides Avances
Office National D Etudes Et de Recherches Aerospatiales, Paris (France).
B. Crampel. 1967, 51p ELDO/SP/67/-7
Lang- in French, English Summary Conf- Presented At the Eldo Symp. on Propulsion, Paris, 10-12 Oct. 1967 Subm- Submitted for Publication

Descriptors: *High energy propellants, *Hybrid propellant rocket engines, *Hybrid propellants, Combustion efficiency, Cost estimates, Liquid oxidizers, Liquid rocket propellants, Propulsion system performance, Solid propellants, Specific impulse, Storable propellants.

For abstract, see STAR 06 10.
N68-20392 HC$3.00 MF$0.65

PROSPECTIVE EVALUATION OF HYBRID PROPELLANT ROCKET ENGINES FOR ELDO APPLICATIONS.
Evaluation Prospective de l'Interet des Moteurs A Lithergol pour l'Eldo
Office National D Etudes Et de Recherches Aerospatiales, Paris (France).
D. Duban. Apr 66, 106p ONERA-NT-2/1233-EY
Contract CTR-17/3/4
Lang- in French Prep- Prepared for Eldo

Descriptors: *Eldo launch vehicle, *European space programs, *Hybrid propellant rocket engines, Combustion chambers, Combustion control, Ducted rocket engines, Fuel injection, Guidance (motion), Missile control, Restartable rocket engines, Stabilization, Thrust programming, Thrust vector control.

For abstract, see STAR 06 10.
N68-20493 HC$3.00 MF$0.65

21I. Rocket Propellants

CRYOGENIC PROPELLANT VENTING UNDER LOW PRESSURE CONDITIONS FINAL REPORT.
National Bureau of Standards, Boulder, Colo. Cryogenics Div.
P. J. Giarratano, M. C. Jones, and A. U. Simpson.
2 Feb 68, 109p NASA-CR-93744, NBS-9703
NASA ORDER R-45

Descriptors: *Cryogenic rocket propellants, *Heat transfer coefficients, *Venting, *Wall temperature, Free flow, Low pressure, Mixtures, Nitrogen, Para hydrogen, Pipe flow, Tables (data), Vacuum chambers.

For abstract, see STAR 06 10.
N68-19799 HC$3.00 MF$0.65

EXPLORING IN AEROSPACE ROCKETRY. 6 - SOLID-PROPELLANT ROCKET SYSTEMS.
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
For primary bibliographic entry see Field 21H.
For abstract, see STAR 06 10.
N68-19831 HC$3.00 MF$0.65

EXPLORING IN AEROSPACE ROCKETRY. 4 - THERMODYNAMICS.
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
M. C. Burrows. 1968, 21p NASA-TM-X-52391
Refs Conf- Presented At Lewis Aerospace Explorers Conf., Cleveland, 1966-1967

Descriptors: *Liquid rocket propellants, *Solid rocket propellants, *Thermodynamics, Combustion chambers, Combustion efficiency, Injectors, Liquid-gas mixtures, Propellant combustion.

For abstract, see STAR 06 10.
N68-19840 HC$3.00 MF$0.65

SOME ASPECTS OF STEADY-STATE PROPELLANT COMBUSTION AS RELATED TO DYNAMIC COUPLING MECHANISMS.
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
For primary bibliographic entry see Field 21B.
For abstract, see STAR 06 10.
N68-20042 HC$3.00 MF$0.65

TECHNIQUE FOR DETERMINING GASES DISSOLVED IN FUELS, OXIDIZERS, AND LIQUIDS IN GENERAL.
Jet Propulsion Lab., Calif. Inst. of Tech., Pasadena.
S. P. Vango. 1 Apr 68, 9p NASA-CR-93791, JPL-TR-32-1236
Contract NAS7-100

Descriptors: *Gas analysis, *Gas pressure, *Liquid oxidizers, *Liquid rocket propellants, Dissolving, Fuel tank pressurization, Manometers, Sampling.

For abstract, see STAR 06 10.
N68-20093 HC$3.00 MF$0.65

RESEARCHES ABOUT THE SYSTEM HYDRAZINE METHYLALCOHOL.
Untersuchungen Am System Hydrazin- Methylalkohol
Deutsche Versuchsanstalt Fur Luft- Und Raumfahrt, Stuttgart (West Germany). Inst. Fuer Raketentreibstoffe.
F. Bachmaier. Jan 68, 21p DLR-FB-68-05, DVL-704
Lang- in German, English Summary

Descriptors: *Hydrazines, *Liquid rocket propellants, *Methyl alcohols, Fluorine, Melting points, Oxidizers, Propellant chemistry, Thermal conductivity, Vapor pressure, Viscosity.

For abstract, see STAR 06 10.
N68-20247 HC$3.00 MF$0.65

REVIEW OF THE STATE OF THE ART AND TECHNOLOGICAL PROGRESS IN THE FIELD OF HYBRID PROPELLANTS.
Rvue de l'Etat Actuel des Connaissances Et des Progres Techniques Realises Sur les Lithergols
Office National D Etudes Et de Recherches Aerospatiales, Paris (France).
M. Barrere, B. Crampel, J. F. Lieberherr, and A. Moutet. Apr 66, 212p ONERA-NT-1/1233-EY
Contract CTR-17/3/4
Lang- in French Prep- Prepared for Eldo

Descriptors: *Combustion physics, *European space programs, *Hybrid propellants, *Rocket engines, Performance prediction, Propulsion system performance, Thrust programming.

For abstract, see STAR 06 10.
N68-20321 HC$3.00 MF$0.65

MATHEMATICAL MODEL FOR SIMULATING LIQUID SLOSHING IN A TANK.
Laboratoire de Recherches Balistiques Et Aerodynamiques, Vernon (France).
For primary bibliographic entry see Field 20D.
For abstract, see STAR 06 10.
N68-20388 HC$3.00 MF$0.65

INTEGRAL TANKS OF THE CRYOGENIC STAGE H3,5.
Rservoirs Structuraux de l'Etage Cryogenique H3,5
Societe L Air Liquide, Sassenage (France). Centre D'etudes Gryogeniques.
J. Menard, and M. Segel. 1967, 25p ELDO/SP/67/-4
Lang- in French, English Summary Conf- Presented At the Eldo Symp. on Propulsion, Paris, 10-12 Oct. 1967 Subm- Submitted for Publication

Descriptors: *Cryogenic rocket propellants, *Hydrogen oxygen engines, *Propellant tanks, Bending, France, Launch vehicle configurations, Liquid propellant rocket engines, Propellant storage, Stress analysis, Structural analysis, Thermal insulation.

For abstract, see STAR 06 10.
N68-20400 HC$3.00 MF$0.65

ELDO FUTURE PROGRAMMES - COMPARISON OF HIGH ENERGY PROPELLANTS FOR UPPER STAGES OF ELDO ' B' SPACE VEHICLE LAUNCHER.
Rocket Propulsion Establishment, Westcott (England).
Jun 64, 42p
Prep- Prepared for Eldo Seri- Its Prelim. Study No. 3

Descriptors: *Cryogenic rocket propellants, *Eldo launch vehicle, *High energy propellants, *Hydrogen oxygen engines, Costs, Fluorine, Gas generators, Ignition, Liquid hydrogen, Liquid oxygen, Payloads, Propellant storage, Rocket exhaust, Thrust chambers, Toxicity, Turbine pumps.

For abstract, see STAR 06 10.
N68-20402 HC$3.00 MF$0.65

QUALITY DETERMINATION OF LIQUID-SOLID HYDROGEN MIXTURES,
National Bureau of Standards, Boulder, Colo. Cryogenics Div.
D. E. Daney, and D. B. Mann. 1967, 6p
Cryogenics v7 n5 p280-5 Oct 1967.

Descriptors: (*Cryogenic propellants, Test methods), (*Hydrogen, Cryogenics), Liquefied gases, Solidified gases, Non-destructive testing, Phase studies, Thermodynamics.
Identifiers: *Slush hydrogen.

Current interest in liquid-solid mixtures of parahydrogen ('slush hydrogen') as a potential rocket propellant lead to a theoretical and experimental investigation of one method of determining liquid-solid quality. It was found that measurement of the mass fraction pumped off during the freeze-thaw process provides a simple, nondestructive, and accurate method of quality determination. It offers the following advantages: (1) It requires the measurement of only (a) the mass of the vapour pumped off, (b) the liquid mass either before or after pumping, and (c) the heat leak into the dewar; (2) It is nondestructive, i. e. it does not require melting the slush; (3)It requires no viewports or apparatus inside the dewar, with the exception of a liquid level indicator; (4) It does not require a homogeneous distribution of the solid.
PB-177 835 HC$3.00 MF$0.65

22. SPACE TECHNOLOGY

22A. Astronautics

MULTIDISCIPLINARY RESEARCH LEADING TO UTILIZATION OF EXTRATERRESTRIAL RESOURCES QUARTERLY STATUS REPORT, 1 OCT. 1967 - 1 JAN. 1968.
Bureau of Mines, Minneapolis, Minn. Research Center.
W. E. Lewis. 1 Jan 68, 38p NASA-CR-93726
NASA ORDER R-09-040-001

Descriptors: *Extraterrestrial environments, *Lunar composition, *Planetary composition, *Resources, Chemical analysis, Manned space flight, Minerals, Mining, Research projects, Technologies, Thermophysical properties.

For abstract, see STAR 06 10.
N68-19819 HC$3.00 MF$0.65

COMPARISON OF FUEL-OPTIMAL MANEUVERS USING A MINIMUM NUMBER OF IMPULSES WITH THOSE USING THE OPTIMAL NUMBER OF IMPULSES - A SURVEY.
Battelle Memorial Inst., Columbus, Ohio.
A. C. Robinson. 12 Dec 67, 83p NASA-CR-93770, BMI-NLVP-TR-68-1
Contract NASW-1146

Descriptors: *Fuel consumption, *Impulses, *Spacecraft maneuvers, Stochastic processes, Transfer orbits, Two body problem.

For abstract, see STAR 06 10.
N68-20035 HC$3.00 MF$0.65

THERMOPHYSICAL ASPECTS AND FEASIBILITY OF A JUPITER ATMOSPHERIC ENTRY.
IIT Research Inst., Chicago, Ill.
J. E. Gilligan. Jan 68, 117p NASA-CR-93814, S-4
Contract NASR-65/06/

Descriptors: *Atmospheric entry, *Computer programs, *Jupiter (planet), *Thermodynamic properties, Ablation, Ablative materials, Atmospheric heating, Heat transfer coefficients, Hydrogen, Jupiter atmosphere, Mathematical models, Stagnation point.

For abstract, see STAR 06 10.
N68-20073 HC$3.00 MF$0.65

CREW MOTION AND THE DYNAMIC ENVIRONMENT OF SPACEBORNE EXPERIMENTS.
Douglas Aircraft Co., Inc., Santa Monica, Calif. Missile and Space Systems Div.
W. A. Beaudry, W. S. Clark, R. H. Grimes, M. A. Iannce, and W. C. Middleton. Jan 68, 253p NASA-CR-61566, DAC-60963
Contract NAS8-21129

Descriptors: *Manned orbital laboratories, *Motion aftereffects, *Motion stability, *Spacecrews, Astronaut performance, Force distribution, Spacecraft control, Spacecraft design, Systems analysis.

For abstract, see STAR 06 10.
N68-20358 HC$3.00

RESPONSE CHARACTERISTICS OF IMPACTING PENETROMETERS APPROPRIATE TO LUNAR AND PLANETARY MISSIONS.
National Aeronautics and Space Administration. Langley Research Center, Langley Station, Va.
H. D. Carden, and J. L. Mc Carty. Apr 68, 81p NASA-TN-D-4454
Contract 124-08-05-15-23

Descriptors: *Impact loads, *Lunar soil, *Penetrometers, Dynamic response, Lunar crust, Lunar geology, Penetration, Planetary surfaces.

For abstract, see STAR 06 10.
N68-20364 HC$3.00 MF$0.65

REPORT OF THE ADVISORY COMMITTEE ON PROGRAMMES FINAL REPORT.
European Space Conference, Paris (France).
Dec 67, 127p CSE/CCP/67/5

Descriptors: *Conferences, *European space programs, Communication satellites, Coordination, Costs, Economics, Eldo launch vehicle, Electric propulsion, European space research organization sat, Hydrogen oxygen engines, Meteorological satellites, Scientific satellites, Space missions.

For abstract, see STAR 06 10.
N68-20417 HC$3.00 MF$0.65

22B. Spacecraft

ORBIT DETERMINATION OF A NON-TRANSMITTING SATELLITE USING DOPPLER TRACKING DATA.
General Electric Co., Philadelphia, Pa. Missile and Space Div.
For primary bibliographic entry see Field 22C.
AD-419 890 HC$3.00

OPTICAL TRACKING OF DEEP-SPACE PROBES.
Boeing Scientific Research Labs Seattle Wash Geo-Astro Physics Lab
For primary bibliographic entry see Field 17H.
AD-668 001 Not available from CFSTI.

A ROLE FOR INTEGRATED CIRCUITS IN SOUNDING ROCKET PAYLOAD CONTROL APPLICATIONS.
National Research Council of Canada Ottawa (Ontario) Radio and Electrical Engineering Div
K. A. Steele. Feb 68, 5p
NRC-9991
Availability: Published in Canadian Aeronautics and Space Journal, v14 n2 p57-60 1968.

Descriptors: (*Sounding rockets, Payload), (*Integrated circuits, *Flight control systems), Design, Reliability (Electronics), Costs, Telemeter systems, Aerial cameras, Nose cones, Operation, Timing circuits, Electrical properties, Sensitivity, Noise (Radio).

The availability of low-cost integrated circuits allows electronic programs of increased complexity to be carried in scientific sounding rocket payloads. Discrete component designs are restricted to simple control functions because of space limitations, cost, and the difficulty in achieving acceptable reliability. The advantages of using integrated circuits in control applications in sounding rockets are discussed with reference to a timer designed for controlling the operation of a group of cameras. (Author)
AD-668 045 Not available from CFSTI.

FUTURE NEEDS AND TRADEOFFS FOR LONG LIFE SPACECRAFT.
Aerospace Corp El Segundo Calif El Segundo Technical Operations
R. W. Slocum, E. I. Roberts, and R. J. Smith. Jan 68, 42p Rept no. TR-0158 (3525-15)-1
SAMSO-TR-68-101
Contract F04695-67-C-0158

Descriptors: (*Military satellites, Design), Life expectancy, Costs, Launch vehicles (Aerospace), Satellite networks, Synchronous satellites, Communication satellites (Active), Scientific satellites, Cost effectiveness, Modification kits, Navigation satellites, Meteorological satellites, Polar orbit trajectories, Department of Defense, Communication satellites (Passive), Stabilization systems, Reliability, Quality control.
Identifiers: IDCSP (Initial Defense Communications Satellite Program), *Initial defense communications satellite program, *Long-life spacecraft, Titan 3, Tradeoffs, Mean time to failure, MTTF (Mean Time To Failure).

Three basic areas related to long-life military spacecraft are examined. First, the background for such spacecraft is described, and representative satellite designs are utilized to demonstrate the economic savings achievable. Second, as an example of the application of reliability specifications to an actual program, the history and development of these specifications in the Initial Defense Communications Satellite Program (IDCSP) are presented. Reliability and quality assurance aspects of proposed programs are then examined from the standpoint of ensuring that specifications will be met. Specific techniques are not considered for achieving long spacecraft life in the various mission areas. (Author)
AD-668 076 HC$3.00 MF$0.65

A TIME-LAG GENERATOR FOR SPACECRAFT MAGNETIC DAMPING SYSTEMS.
Technical memo.,
Johns Hopkins Univ Silver Spring Md Applied Physics Lab
Roy F. Sloan. Jan 68, 69p Rept no. APL-TG-965
Contract NOw-62-0604

Descriptors: (*Scientific satellites, *Stabilization systems), (*Attitude control systems, Damping), (*Geodesics, Scientific satellites), Delay circuits, Design, Time, Models (Simulations), Orbital trajectories, Sampling, Operation, Analog-to-digital converters, Digital-to-analog converters, Transistors, Relaxation oscillators, Synchronous satellites.
Identifiers: DODGE (Satellite), *Time-lag generators.

The circuit design of a subsystem used to approximate a time lag of several hours for use in spacecraft magnetic damping systems is discussed. Prior to the discussion of the electronics, a brief and very basic description is given of how the damping system operates and how the time-lag generator contributes to its operation. Two circuit designs are then discussed in detail. The first employs a simple sample-and-hold technique and was used in the DODGE satellite. The second, an extension of the first, uses an additional level of memory and might find application in similar satellites in the future. Some results of breadboard tests of both types of time-lag generator are included. (Author)
AD-668 138 HC$3.00 MF$0.65

DIGITAL ATTITUDE SIMULATION INPUTTOR DICTIONARY.
Technical memo.,
Johns Hopkins Univ Silver Spring Md Applied Physics Lab
P. Pardoe. Feb 68, 115p Rept no. APL-TG-964A
Contract NOw-62-0604
See also AD-668 141.

Descriptors: (*Satellites (Artificial), Attitude control systems), (*Attitude control systems, *Computer programs), Dictionaries, Simulation, Mathematical models, Orbital trajectories, Equations of motion, Magnetic fields, Solar wind, Torque, Gimbals, Hysteresis, Punched cards.
Identifiers: *Inputtor dictionaries.

This appendix lists the names for and gives the definitions of the terms mentioned in report TG-964.
AD-668 140 HC$3.00 MF$0.65

A DESCRIPTION OF THE DIGITAL ATTITUDE SIMULATION.
Technical memo.,
Johns Hopkins Univ Silver Spring Md Applied Physics Lab
P. P. Pardoe. Feb 68, 130p Rept no. APL-TG-964
Contract NOw-62-0604
See also AD-668 140.

Descriptors: (*Satellites (Artificial), Attitude control systems), (*Attitude control systems, *Computer programs), Simulation, Mathematical models, Orbital trajectories, Equations of motion, Perturbation theory, Gravity, Solar wind, Terrestrial magnetism, Configuration, Spin, Stabilization systems, Damping, Flow charting, Digital computers.
Identifiers: DAS computer programs, Gravity-gradient stabilization.

The Digital Attitude Simulation (DAS) described deals with the trajectory and attitude motion of an earth-orbiting spacecraft of very general configuration. The spacecraft may have a mass distribution as a function of time and one generalized coor-

dinate. The equations of motion are derived using Lagrangian mechanics. Perturbations owing to the higher order terms of the earth's potential, radiation pressure, and earth's magnetic field are described. The program can simulate the action of spin, gravity-gradient, or magnetically stabilized spacecraft. Options for using rotors, gravity-gradient booms, and a large variety of damping schemes including hysteresis, eddy current, time-lag, ball-in-ball, gimballed boom, and viscous dampers are available. (Author)
AD-668 141 HC$3.00 MF$0.65

SOLAR CELL POWER SYSTEMS FOR APL SATELLITES.
Johns Hopkins Univ Silver Spring Md Applied Physics Lab
For primary bibliographic entry see Field 10B.
AD-668 144 HC$3.00 MF$0.65

AEROSPACE EXPANDABLE AND MODULAR STRUCTURES CONFERENCE (3rd), TRANSACTIONS, HELD AT THE CARILLON HOTEL, MIAMI BEACH, FLORIDA, MAY 16-18, 1967.
Air Force Aero Propulsion Lab Wright-Patterson AFB Ohio
For primary bibliographic entry see Field 13M.
AD-668 181 HC$3.00 MF$0.65

THE INTERNAL RADIATION ENVIRONMENT OF CYLINDRICAL SPACECRAFT.
Meeting speech.
Massachusetts Inst of Tech Lexington Lincoln Lab
Charles L. Mack. 14 Jul 67, 7p Rept no. MS-1923
ESD-TR-68-31
Contract AF 19(628)-5167
Availability: Published in IEEE Transactions on Nuclear Science, vNS-14 n6 p204-9 Dec 1967.

Descriptors: (*Scientific satellites, *Shielding), Space simulation chambers, Cylindrical bodies, Model tests, Electron density, Scattering, Angle of arrival, Terrestrial magnetism, Aluminum alloys, Test methods, Space environmental conditions, Instrumentation, Structural shells, Absorption, Predictions, Degradation, Van Allen radiation belt.

A laboratory study of the shielding against energetic electrons afforded by cylindrical aluminum satellites is reported. The incident electron flux had a near-exponential integral energy distribution with a folding energy of 500 kev over the range: 140 kev to 3.0 Mev. The angle of incidence was isotropic in the plane normal to the cylindrical axis and randomly distributed within an envelope of approximately plus or minus 55 degrees in the orthogonal plane. The satellite was thus simulated at an erect attitude to the earth's magnetic field in a region of trapped radiation. (Author)
AD-668 199 Not available from CFSTI.

ELECTRON CONTENT FLUCTUATIONS ASSOCIATED WITH A MAGNETIC STORM COMMENCING ON MAY 25, 1967.
Naval Research Lab Washington D C
For primary bibliographic entry see Field 8N.
AD-668 213 HC$3.00 MF$0.65

THE SHOCK AND VIBRATION BULLETIN.
Shock and Vibration Information Center (Defense) Washington D C
For primary bibliographic entry see Field 20K.
AD-668 246 HC$3.00 MF$0.65

THE SHOCK AND VIBRATION BULLETIN, PART VI.
Shock and Vibration Information Center (Defense) Washington D C
For primary bibliographic entry see Field 20K.
AD-668 328 HC$3.00 MF$0.65

INFLUENCE OF A SOLAR ACTIVE REGION ON THE INTERPLANETARY MAGNETIC FIELD.
California Univ Berkeley Space Sciences Lab
For primary bibliographic entry see Field 20C.
AD-668 377 Not available from CFSTI.

MERGED STAGNATION SHOCK LAYER OF NONEQUILIBRIUM DISSOCIATING GAS,
Aerospace Corp El Segundo Calif El Segundo Technical Operations
Paul M. Chung, James F. Holt, and Shaowen W. Liu. Jan 68, 47p Rept no. TR-0158 (3240-10)-8
SAMSO-TR-68-143
Contract F04695-67-C-0158

Descriptors: (*Reentry vehicles, Nonequilibrium flow), (*Atmosphere entry, Chemical reactions), Dissociation, Recombination reactions, Shock waves, Gas ionization, Numerical analysis, Stagnation point, Blunt bodies, Navier-Stokes equations, Reynolds number, Surface properties, Thickness, Viscosity.

The paper presents the formulation of the problem, the numerical method leading to solution, and the physical significance of the results obtained for the fluid flow of a viscous merged layer with nonequilibrium chemical reactions. The solution is limited to the stagnation region of a blunt body. The chemical reactions considered are the dissociation and the recombination of air. It is first shown that the reduced Navier-Stokes equation and the corresponding energy and species conservation equations, wherein certain curvature effects have been neglected, are sufficiently accurate for the flow regime in which Re > or approx. 20, where Re is the Reynolds number behind the bow shock. It is also shown that only in this regime are the nonequilibrium chemical reactions important. From the solutions it was found, as was expected, that a strong coupling exists between the chemical reactions and the rarefaction of the shock layer. One of the unexpected results is that, for a given flight condition, increase of the surface catalycity causes the shock layer to become thinner. Since the increase in surface catalycity reduces the degree of dissociation within the merged shock layer, it had been expected that it would increase the shock layer thickness instead of decreasing it. The physical interpretation of the phenomenon and its possible implications are discussed. (Author)
AD-668 442 HC$3.00 MF$0.65

SPACE PROGRAMS SUMMARY NO. 37-49, VOLUME I FOR THE PERIOD NOVEMBER 1 TO DECEMBER 31, 1967. FLIGHT PROJECTS.
Jet Propulsion Lab., Calif. Inst. of Tech., Pasadena.
31 Jan 68, 98p NASA-CR-93680, JPL-SPS-37-49, V. 1
Contract NAS7-100

Descriptors: *Interplanetary spacecraft, *Mission planning, *Space exploration, *Spacecraft design, Interplanetary flight, Lunar topography, Mariner space probes, Mars surface, Structural analysis, Surveyor project, Venus (planet).

For abstract, see STAR 06 10.
N68-19612 HC$3.00 MF$0.65

GUIDANCE, FLIGHT MECHANICS AND TRAJECTORY OPTIMIZATION. VOLUME 2 - OBSERVATION THEORY AND SENSORS.
North American Aviation, Inc., Downey, Calif.
A. S. Abbott, and B. J. Miller. Mar 68, 181p
NASA-CR-1001, SID-65-1200-2, V. 2
Contract NAS8-11495
Coll- 181 P Refs

Descriptors: *Booster rockets, *Space navigation, *Spacecraft guidance, Flight mechanics, Inertial navigation, Radiation measuring instruments, Sensors, State vectors, Trajectory optimization.

For abstract, see STAR 06 10.
N68-19676 HC$3.00 MF$0.65

DYNAMIC PRESSURE OF A VOLUME WITH VARIOUS ORIFICES AND OUTGASSING MATERIALS.
National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
For primary bibliographic entry see Field 20D.
For abstract, see STAR 06 10.
N68-19704 HC$3.00 MF$0.65

ADVANCED TECHNOLOGICAL SATELLITE ELECTRO-MECHANICAL DESPUN ANTENNA FINAL REPORT.
Sylvania Electric Products, Inc., Waltham, Mass. Electronic Systems Eastern Div.
For primary bibliographic entry see Field 9F.
For abstract, see STAR 06 10.
N68-19789 HC$3.00 MF$0.65

DESIGN, FABRICATION AND TESTING OF SUBSCALE PROPELLANT TANKS WITH CAPILLARY TRAPS FINAL REPORT, 26 JUN. 1967 - 15 MAR. 1968.
Martin Co., Denver, Colo.
For primary bibliographic entry see Field 20K.
For abstract, see STAR 06 10.
N68-19836 HC$3.00 MF$0.65

INTEGRATED MANNED INTERPLANETARY SPACECRAFT CONCEPT DEFINITION. VOLUME 5 - PROGRAM PLANS AND COSTS FINAL REPORT.
Boeing Co., Seattle, Wash. Space Div.
Jan 68, 296p NASA-CR-66563, D2-113544-5
Contract NAS1-6774

Descriptors: *Costs, *Interplanetary spacecraft, *Manned space flight, *Mission planning, Earth-mars trajectories, Interplanetary flight, Nuclear propulsion, Space exploration, Systems engineering, Venus (planet).

For abstract, see STAR 06 10.
N68-19837 HC$3.00 MF$0.65

STRESSES CAUSED BY AN IN PLANE LINE LOAD USED TO ROTATE A THIN-WALLED SPHERICAL SATELLITE.
National Aeronautics and Space Administration. Langley Research Center, Langley Station, Va.
W. J. Stroud, and N. P. Sykes. Apr 68, 36p
NASA-TN-D-4425
Contract 124-08-06-02-23

Descriptors: *Echo satellites, *Loads (forces), *Thin walled shells, Linear equations, Sine waves, Spheres, Spherical shells, Stress analysis, Tables (data).

For abstract, see STAR 06 10.
N68-20198 HC$3.00 MF$0.65

A STUDY OF THE THERMAL BEHAVIOUR OF THE ESRO 1 SATELLITE. PART 1 - THE MATHEMATICAL MODEL.
Etude Du Comportement en Temperature Du Satellite Esro 1, Premiere Partie - La Modele Mathematique
European Space Technology Center, Noordwijk (Netherlands).
J. Doenecke, A. Taroni, M. Toussaint, and O. Ullmann. Oct 67, 55p ESRO-TN-20/ESTEC/
Coll- 55 P Refs

Descriptors: *Esro 1 satellite, *Mathematical models, *Thermal radiation, *Thermodynamic properties, Conductive heat transfer, Heat balance, Isotherms, Radiative heat transfer, Surface properties.

For abstract, see STAR 06 10.
N68-20241 HC$3.00 MF$0.65

RESULTS OF VIBRATION TESTS ON ESRO 1 SATELLITE.
Ergebnisse Der Vibrations Pruefungen Mit Dem Forschungssatelliten Esro 1
Contraves Corp., Zurich (Switzerland).
H. H. Schultz. 1967, 26p WGLR/DGRR-PAPER-51
Lang- in German Conf- Presented At the Joint Ann. Meeting of Wglr/Dgrr, Karlsruhe, W. Germany, Oct. 1967

Descriptors: *Esro 1 satellite, *Structural vibration, *Vibration tests, Conferences, Environmental tests, Piezoelectric gages, Recording instruments, Vibration damping.

For abstract, see STAR 06 10.
N68-20490 HC$3.00 MF$0.65

THE UTILITY OF SATELLITE CLOUD PHOTOGRAPHS IN OBJECTIVE ANALYSIS OF THE 500-MB HEIGHT FIELD.
Michigan Univ., Ann Arbor. Dept. of Meteorology and Oceanography.
For primary bibliographic entry see Field 4B.
PB-177 880 HC$3.00 MF$0.65

22C. Spacecraft Trajectories and Reentry

ORBIT DETERMINATION OF A NON-TRANSMITTING SATELLITE USING DOPPLER TRACKING DATA.
Special rept. (Final),
General Electric Co., Philadelphia, Pa. Missile and Space Div.
Paul B. Richards. Oct 60, 37p SR-12
ARPA Order-858

Descriptors: (*Satellites (Artificial), *Space surveillance systems), (*Orbital trajectories, Mathematical prediction), Doppler effect, Elliptical orbit trajectories, Position finding, Radar tracking, Ellipsoids, Transformations (Mathematics), Differential equations, Equations of motion, Numerical methods and procedures, Perigee, Apogee, Velocity, Mathematical prediction.
Identifiers: Computer analysis.

A method is presented for predicting the orbit of a passive (Non-transmitting) satellite, using exclusively doppler data collected during one passage of the satellite by a tracking system consisting of only one transmitter and one receiver. Equations are derived which relate passive satellite doppler tracking data to range, speed and time parameters at closest approach. These determine an ellipsoid whose foci are the transmitter and receiver stations. The satellite lies on this ellipsoid, and its trajectory is tangent to the surface. The satellite position and velocity components at closest approach are calculated on a digital computer using information contained in the doppler data together with the geometry of the tracking system. Preliminary orbits determined in this way agree favorably with the refined orbits of BRL and space track. (Author)
AD-419 890 HC$3.00

OPTICAL TRACKING OF DEEP-SPACE PROBES,
Boeing Scientific Research Labs Seattle Wash Geo-Astro Physics Lab
For primary bibliographic entry see Field 17H.
AD-668 001 Not available from CFSTI.

RADIO PROPAGATION IN RE-ENTRY PLASMAS,
Boeing Scientific Research Labs Seattle Wash Plasma Physics Lab
For primary bibliographic entry see Field 17B.
AD-668 162 HC$3.00 MF$0.65

LINE-OF-SIGHT VELOCITY AS AN INDICATOR OF PERICYNTHION ALTITUDE OF SELENOCENTRIC ORBITS.
National Aeronautics and Space Administration. Langley Research Center, Langley Station, Va.
J. L. Williams. Mar 68, 18p NASA-TM-X-1508
Contract 125-17-05-01-23

Descriptors: *Lunar landing, *Lunar orbits, *Trajectory control, Approximation, Ballistic trajectories, Linear equations, Lunar topography, Orbit calculation, Rendezvous, Trajectory analysis, Velocity distribution.

For abstract, see STAR 06 10.
N68-19622 HC$3.00 MF$0.65

STUDY OF APOLLO WATER IMPACT. VOLUME 1 - HYDRODYNAMIC ANALYSIS OF APOLLO WATER IMPACT FINAL REPORT.
North American Aviation, Inc., Downey, Calif. Space Div.
T. Li, and T. Sigimura. May 67, 60p NASA-CR-92019, SID-67-498, V. 1
Contract NAS9-4552

Descriptors: *Apollo spacecraft, *Command modules, *Impact prediction, *Mathematical models, *Water landing, Hydrodynamic equations, Spherical shells, Surface reactions.

For abstract, see STAR 06 10.
N68-19743 HC$3.00 MF$0.65

TRAJECTORY OPPORTUNITIES TO THE OUTER PLANETS FOR THE PERIOD 1975-2000.
IIT Research Inst., Chicago, Ill. Astro Sciences Center.
B. J. Rejzer. Dec 67, 27p NASA-CR-93783, T-20
Contract NASR-65/06/

Descriptors: *Jupiter (planet), *Neptune (planet), *Pluto (planet), *Saturn (planet), *Trajectory optimization, *Uranus (planet), Launch dates, Launch windows, Mission planning, Space exploration, Tables (data).

For abstract, see STAR 06 10.
N68-19907 HC$3.00 MF$0.65

GUIDANCE, FLIGHT MECHANICS AND TRAJECTORY OPTIMIZATION. VOLUME 14 - ENTRY GUIDANCE EQUATIONS.
North American Aviation, Inc., Downey, Calif.
E. F. Knotts, and M. B. Tamburro. Apr 68, 149p NASA-CR-1013, SID-66-1678-6, V. 14
Contract NAS8-11495
Coll- 149 P Refs

Descriptors: *Atmospheric entry, *Equations of motion, *Spacecraft guidance, *Spacecraft trajectories, Apollo spacecraft, Atmospheric models, Coordinates, Gemini spacecraft, Integral equations.

For abstract, see STAR 06 10.
N68-19985 HC$3.00 MF$0.65

GUIDANCE, FLIGHT MECHANICS AND TRAJECTORY OPTIMIZATION. VOLUME 7 - THE PONTRYAGIN MAXIMUM PRINCIPLE.
North American Aviation, Inc., Downey, Calif.
J. E. Mc Intyre. Apr 68, 129p NASA-CR-1006, SID-65-1200-7, V. 7
Contract NAS8-11495
Coll- 129 P Refs

Descriptors: *Calculus of variations, *Maxima, *Minima, *Pontryagin principle, *Trajectory analysis, Differential calculus, Maximum principle, Spacecraft control, Trajectory optimization.

For abstract, see STAR 06 10.
N68-20084 HC$3.00 MF$0.65

A FAST METHOD OF ORBIT COMPUTATION.
National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
For primary bibliographic entry see Field 3C.
For abstract, see STAR 06 10.
N68-20356 HC$3.00 MF$0.65

ON THE USE OF RANGE AND RANGE RATE MEASUREMENTS IN THE NEW R.A.E. ORBIT DETERMINATION PROGRAM.
Royal Aircraft Establishment, Farnborough (England).
R. M. Gooding. Jul 67, 10p RAE-TR-67199
Conf- Presented At the Cospar Intern. Space Sci. Symp., London, Jul. 1967

Descriptors: *Orbit calculation, *Range and range rate tracking, *Satellite tracking, Computer programs, Minitrack system, Ogo-b, Orbital elements, Tracking networks.

For abstract, see STAR 06 10.
N68-20367 HC$3.00 MF$0.65

ANALYTICAL CALCULATION OF PARTIAL DERIVATIVES RELATING LUNAR AND PLANETARY MIDCOURSE CORRECTION REQUIREMENTS TO GUIDANCE SYSTEM INJECTION ERRORS.
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
G. L. Cole, and F. Teren. Apr 68, 39p NASA-TN-D-4518
Contract 125-17-05-01-22

Descriptors: *Equations of motion, *Error analysis, *Midcourse guidance, *Transfer orbits, Computerized simulation, Linear equations, Many body problem, Partial differential equations, Space exploration, Trajectory analysis.

For abstract, see STAR 06 10.
N68-20368 HC$3.00 MF$0.65

SATELLITE TEMPERATURE AS A FUNCTION OF ECLIPSE TIME.
Contraves Corp., Zurich (Switzerland).
H. Eder. 1967, 24p

Descriptors: *Elliptical orbits, *Heat balance, *Temperature gradients, Esro 1 satellite, Isotherms, Orbit calculation, Problem solving, Satellite orbits, Temperature distribution, Thermodynamics.

For abstract, see STAR 06 10.
N68-20401 HC$3.00 MF$0.65

ELDO FUTURE PROGRAMS - STUDY OF PERTURBATIONS OF CERTAIN ORBITS FOR TELECOMMUNICATION SATELLITES.
National Aero- and Astronautical Research Inst., Amsterdam (Netherlands).
C. R. Traas. 31 Jul 64, 30p NLR-G-35
Prep- Prepared for Eldo

Descriptors: *Communication satellites, *Numerical analysis, *Orbit perturbation, Computer programs, Equatorial orbits, Lunar gravitational effects, Numerical integration, Polar orbits, Quantitative analysis, Solar gravitation, Telecommunication, Twenty-four hour orbits.

For abstract, see STAR 06 10.
N68-20415 HC$3.00 MF$0.65

FURTHER STUDIES OF THE LIFETIMES OF SATELLITES IN LARGE-ECCENTRICITY ORBITS.
Royal Aircraft Establishment, Farnborough (England).
G. E. Cook, and D. W. Scott. Aug 68, 16p RAE-TR-67189, RAE-TR-65292
Subm- Submitted for Publication Rean- Suppl. To Rae-tr-65292

Descriptors: *Eccentricity, *Orbit decay, *Predictions, *Satellite lifetime, *Satellite orbits, Elektron 2 satellite, Elektron 4 satellite, Long term effects, Orbit perturbation, Orbital elements.

For abstract, see STAR 06 10.
N68-20436 HC$3.00 MF$0.65

POSITION KEEPING AND THREE AXIAL CONTROL OF A TELECOMMUNICATION SATELLITE.
Maintien A Poste Et Pilotage Trois Axes D'un Satellite de Telecommunications
Laboratoire de Recherches Balistiques Et Aerodynamiques, Vernon (France).
C. Marechal. 17 Jan 68, 78p NT-10/68/EN
Lang- in French

Descriptors: *Attitude control, *Communication satellites, *Satellite orientation, *Synchronous satellites, Attitude gyros, Eldo launch vehicle, Inertial guidance, Lunar gravitational effects, Solar gravitation, Spin stabilization.

For abstract, see STAR 06 10.
N68-20437 HC$3.00 MF$0.65

GUIDANCE, FLIGHT MECHANICS AND TRAJECTORY OPTIMIZATION. VOLUME 8 - BOOST GUIDANCE EQUATIONS.
North American Aviation, Inc., Downey, Calif.
A. S. Abbott, R. R. Palmer, and G. E. Townsend.
Apr 68, 134p NASA-CR-1007, SID-65-1200-8
Contract NAS8-11495
Coll- 134 P Refs

Descriptors: *Iterative solution, *Launch vehicles, *Perturbation theory, *Spacecraft guidance, *Steering, Flight mechanics, Polynomials, Trajectory optimization.

For abstract, see STAR 06 10.
N68-20449 HC$3.00 MF$0.65

GUIDANCE, FLIGHT MECHANICS AND TRAJECTORY OPTIMIZATION. VOLUME 9 - GENERAL PERTURBATIONS THEORY.
North American Aviation, Inc., Downey, Calif.
B. Kampos. Apr 68, 205p NASA-CR-1008, SID-66-1678-1
Contract NAS8-11495
Coll- 205 P Refs

Descriptors: *Flight mechanics, *Perturbation theory, *Spacecraft guidance, *Trajectory optimization, Mission planning, Oblate spheroids, Orbit perturbation, Radiation pressure.

For abstract, see STAR 06 10.
N68-20450 HC$3.00 MF$0.65

GUIDANCE, FLIGHT MECHANICS AND TRAJECTORY OPTIMIZATION. VOLUME 16 - MISSION CONSTRAINTS AND TRAJECTORY INTERFACES.
North American Aviation, Inc., Downey, Calif.
R. L. Robertson. Apr 68, 128p NASA-CR-1015, SID-66-1678-8, V. 16
Contract NAS8-11495
Coll- 128 P Refs

Descriptors: *Mission planning, *Rendezvous trajectories, *Space missions, *Trajectory optimization, Atmospheric entry, Earth orbital rendezvous, Launching.

For abstract, see STAR 06 10.
N68-20468 HC$3.00 MF$0.65

SATELLITE RESONANCE WITH LONGITUDE-DEPENDENT GRAVITY. 2 - EFFECTS INVOLVING THE ECCENTRICITY.
Royal Aircraft Establishment, Farnborough (England).
R. R. Allan. Jul 67, 32p RAE-TR-67172
Conf- Presented At the Cospar Symp., London, Jul. 1967

Descriptors: *Eccentricity, *Gravitation, *Longitude, *Resonance, *Satellite orbits, Celestial mechanics, Gravitational fields, Hansen lunar theory, Librational motion, Long term effects, Orbit perturbation, Oscillations, Periodic variations.

For abstract, see STAR 06 10.
N68-20485 HC$3.00 MF$0.65

CALCULATION OF ATTITUDE CONTROL OF ESRO 1 MAGNETIC STABILIZED SATELLITE WITH ANALOG COMPUTER.
Berechnung des Lageverhaltens des Magnetisch Stabilisierten Satelliten Esro 1 Auf Einem Analogrechner
Contraves Corp., Zurich (Switzerland).
F. D. Haenni. 1967, 19p WGLR/DGRR-PAPER-62
Lang- in German Conf- Presented At the Joint Ann. Meeting of Wglr/Dgrr, Karlsruhe, W. Germany, Oct. 1967

Descriptors: *Esro 1 satellite, *Magnetic control, *Mathematical models, *Satellite attitude control, Analog computers, Conferences, Digital computers, Geomagnetism, Lines of force, Polar orbits, Stabilization, Yo-yo devices.

For abstract, see STAR 06 10.
N68-20491 HC$3.00 MF$0.65

22D. Spacecraft Launch Vehicles and Ground Support

AAP PRELIMINARY RANGE SAFETY ANALYSIS.
Chrysler Corp., New Orleans, La. Space Div.
Jul 67, 29p NASA-CR-93715, SSR-105
Contract NAS8-4016

Descriptors: *Command service modules, *Range safety, *Rocket nose cones, *Saturn 1b launch vehicles, Impact prediction, Launch vehicle configurations, Trajectory analysis.

For abstract, see STAR 06 10.
N68-19572 HC$3.00 MF$0.65

A MONOGRAPH ON EXIT STABILITY. VOLUME 3 - STRUCTURES. PART B - LOADS AND STRUCTURAL DYNAMICS.
General Dynamics/Convair, San Diego, Calif.
R. F. Ringland. Feb 67, 171p NASA-CR-61681, GDC-BTD-67-029, V. 3, PT. B
Contract NAS8-11486

Descriptors: *Dynamic structural analysis, *Flight control, *Launch vehicles, *Loads (forces), Dynamic models, Equations of motion, Frequency ranges, Linear systems, Systems engineering.

For abstract, see STAR 06 10.
N68-19824 HC$3.00 MF$0.65

EXPLORING IN AEROSPACE ROCKETRY. 17 - ROCKET TESTING AND EVALUATION IN GROUND FACILITIES.
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
J. H. Povolny. 1968, 20p NASA-TM-X-52404
Conf- Presented At Lewis Aerospace Explorers Conf., Cleveland, 1966-1967

Descriptors: *Booster rocket engines, *Ground tests, *Rocket test facilities, *Structural reliability, Aerospace environments, Dynamic structural analysis, Performance prediction.

For abstract, see STAR 06 10.
N68-19936 HC$3.00 MF$0.65

SEMIANNUAL REVIEW OF RESEARCH AND ADVANCED DEVELOPMENT, VOLUME 1 PROGRESS REPORT, 1 JUL. - 31 DEC. 1967.
Jet Propulsion Lab., Calif. Inst. of Tech., Pasadena.
31 Dec 67, 467p NASA-CR-93736, RAD-701-6, V. 1
Contract NAS7-100

Descriptors: *Astronomy, *Bioastronautics, *Launch vehicles, *Lunar exploration, *Physical sciences, *Planetary environments, Space exploration.

For abstract, see STAR 06 10.
N68-20008 HC$3.00 MF$0.65

STUDY OF ADVANCED MULTIPURPOSE LARGE LAUNCH VEHICLES SUMMARY REPORT.
Boeing Co., Huntsville, Ala.
Jan 68, 31p NASA-CR-73154
Contract NAS2-4079

Descriptors: *Launch vehicle configurations, *Performance prediction, *Structural design, *Systems analysis, Payload mass ratio, Propulsion system configurations, Solid propellant rocket engines, Systems engineering.

For abstract, see STAR 06 10.
N68-20046 HC$3.00 MF$0.65

ELDO INITIAL PROGRAM. R.F.I. MEASUREMENTS CARRIED OUT ON THE EMU F6/2 BUILD AT STEVENAGE DURING MAY 1967.
Hawker Siddeley Dynamics, Ltd., Stevenage (England). Command and Tracking Group.
J. Kerr, and D. Waller. 23 Jun 67, 24p ELDO-RFI-10, LX-288
1967 Coll- 24 P Prep- Prepared for Eldo

Descriptors: *Eldo launch vehicle, *Radio frequency interference, *Telemetry, Frequency modulation, Guidance (motion), Launch vehicle configurations, Measurement, Pulse code modulation, Radar, Radio attenuation, Radio transmission, Receivers, Simulators, Test equipment, Transponders.

For abstract, see STAR 06 10.
N68-20070 HC$3.00 MF$0.65

ELDO INITIAL PROGRAM. F6/1 MULTISTAGE VEHICLE. RADIO FREQUENCY INTERFERENCE THEORETICAL STUDY - ASSEMBLED VEHICLE ON ITS OWN.
Selenia S. P. A., Rome (Italy).
23 Aug 67, 145p ELDO-RFI-7, TR-67/525
Coll- 145 P Refs Prep- Prepared for Eldo

Descriptors: *Eldo launch vehicle, *Radio frequency interference, *Transponders, Decoupling, Frequency modulation, Launch vehicle configurations, Microwave spectra, Onboard equipment, Pulse code modulation, Radio attenuation, Radio transmission, Receivers, Telemetry, Transmitters.

For abstract, see STAR 06 10.
N68-20071 HC$3.00 MF$0.65

ELDO INITIAL PROGRAM - TASK DEFINITION TD/B 10. R.F.I. MEASUREMENTS CARRIED OUT ON THE EMU F4 BUILD AT STEVENAGE, DURING THE PERIODS 15TH-31ST MARCH AND 15TH JUNE - 1ST JULY 1966.
Hawker Siddeley Dynamics, Ltd., Stevenage (England).
J. Kerr. 1 Sep 66, 124p ELDO-RFI-3
Coll- 124 P Prep- Prepared for Eldo

Descriptors: *Breadboard models, *Eldo launch vehicle, *Radio frequency interference, *Signal measurement, Electric equipment tests, Electrical measurement, European 1 spacecraft, Simulation.

For abstract, see STAR 06 10.
N68-20191 HC$3.00 MF$0.65

ELDO INITIAL PROGRAM - F5 MULTISTAGE VEHICLE. RADIOINTERFERENCE THEORETICAL STUDY.
Selenia S. P. A., Rome (Italy).
18 May 67, 157p ELDO-RFI-4, TR-67/359
Coll- 157 P Prep- Prepared for Eldo

Descriptors: *Eldo launch vehicle, *Radio frequency interference, *Signal measurement, European 1 spacecraft, Launch vehicle configurations, Phase modulation, Signal analysis, Transmitter receivers.

For abstract, see STAR 06 10.
N68-20193 HC$3.00 MF$0.65

PRINCIPLE CHARACTERISTICS AND PERFORMANCES OF DIFFERENT LAUNCHERS UTILIZABLE FOR QUALIFICATION TESTS OF SPACEBORNE EQUIPMENT.
Caracteristiques Principales Et Performances de Divers Lanceurs Utilisables pour La Qualification Spatiale D'equipements
Laboratoire de Recherches Balistiques Et Aerodynamiques, Vernon (France).
C. Marechal, Jan 68, 28p NT-9/68/EN
Lang- in French

Descriptors: *Diamant launch vehicle, *France, *Rubis rocket vehicle, *Veronique rocket vehicles, Airborne equipment, Performance tests, Sounding rockets, Tables (data).

For abstract, see STAR 06 10.
N68-20228 HC$3.00 MF$0.65

ELDO FUTURE PROGRAMS - A PRELIMINARY STUDY OF THE PERFORMANCE AND DESIGN OF APOGEE MOTOR STAGES FOR THE ELDO 'A' LAUNCHING VEHICLE.
Royal Aircraft Establishment, Farnborough (England). Space Dept.
For primary bibliographic entry see Field 21H.
For abstract, see STAR 06 10.
N68-20266 HC$3.00 MF$0.65

EXPLORING IN AEROSPACE ROCKETRY. II - LAUNCH VEHICLES.
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
A. Zimmerman, 1968, 17p NASA-TM-X-52398
Conf- Presented At the Lewis Aerospace Explorers Conf., Cleveland, 1966-1967

Descriptors: *Launch vehicle configurations, *Launch vehicles, *Performance prediction, Burnout, Circular orbits, Systems analysis, Trajectory analysis.

For abstract, see STAR 06 10.
N68-20290 HC$3.00 MF$0.65

ELDO FUTURE PROGRAMS - FEASIBILITY STUDY OF A S. MARCO TYPE RANGE FOR ELDO VEHICLE LAUNCHES.
Rome Univ. (Italy).
M. Marconi, and G. Orsi, 1964, 86p
Seri- Its Study No. 5.3 Prep- Prepared for Eldo

Descriptors: *Eldo launch vehicle, *Ground support equipment, *Launching sites, *Test ranges, European 1 spacecraft, Feasibility, Launching pads, Power supplies, Safety, San marco satellite, Storage tanks, Submarine cables, Umbilical towers.

For abstract, see STAR 06 10.
N68-20301 HC$3.00 MF$0.65

HIGH ENERGY UPPER STAGES FOR ELDO VEHICLES.
Hawker Siddeley Dynamics, Ltd., Stevenage (England). Space Div.
For primary bibliographic entry see Field 21H.
For abstract, see STAR 06 10.
N68-20307 HC$3.00 MF$0.65

ELDO INITIAL PROGRAM - RFI MEASUREMENTS CARRIED OUT ON THE EMU F6/1 BUILD AT STEVENAGE DURING FEBRUARY 1967.
Hawker Siddeley Dynamics, Ltd., Stevenage (England). Command and Tracking Group.
D. E. Campbell, 13 Mar 67, 53p ELDO-RFI-6, LX-272
Coll- 53 P Prep- Prepared for Eldo

Descriptors: *Eldo launch vehicle, *Radio equipment, *Radio frequency interference, *Transmitter receivers, Launch vehicle configurations, Performance tests, Radio filters, Telecommunication.

For abstract, see STAR 06 10.
N68-20348 HC$3.00 MF$0.65

NOTE ON THE FORMAT OF DEVELOPMENT COST PLANS FOR ELDO PROJECTS.
European Space Vehicle Launcher Development Organization, Paris (France).
E. G. Vardy, Jul 67, 55p ELDO-TM-P-3
Lang- in French and English Rean- Revised

Descriptors: *Cost estimates, *Eldo launch vehicle, *Product development, Equipment specifications, European space programs, Ground support equipment, Management planning, Manpower, Scheduling, Structural design.

For abstract, see STAR 06 10.
N68-20391 HC$3.00 MF$0.65

PROPOSED METHOD FOR GENERAL PROGRAMMING OF A SINGLE COMPUTER FOR PRE-LAUNCH CHECK-OUT.
European Space Vehicle Launcher Development Organization, Paris (France). Engineering Coordination Div.
C. Vaugeois, Feb 67, 18p ELDO-TM-E-12

Descriptors: *Checkout, *Computer programming, *Prelaunch tests, *Space vehicle checkout program, Computer storage devices, Data processing, Eldo launch vehicle, Sequencing.

For abstract, see STAR 06 10.
N68-20395 HC$3.00 MF$0.65

USE OF A DIGITAL COMPUTER FOR PRE-LAUNCH CHECKOUT OF THE ELDO-A VEHICLE.
European Space Vehicle Launcher Development Organization, Paris (France). Engineering Coordination Div.
C. Vaugeois, Mar 67, 19p ELDO-TM-E-19

Descriptors: *Checkout, *Digital computers, *Eldo launch vehicle, *Prelaunch tests, Compilers, Data processing, Language programming, Multiprogramming, Sequencing, Space vehicle checkout program, Symbolic programming.

For abstract, see STAR 06 10.
N68-20396 HC$3.00 MF$0.65

ELDO FUTURE PROGRAMMES - COMPARISON OF HIGH ENERGY PROPELLANTS FOR UPPER STAGES OF ELDO 'B' SPACE VEHICLE LAUNCHER.
Rocket Propulsion Establishment, Westcott (England).
For primary bibliographic entry see Field 21H.
For abstract, see STAR 06 10.
N68-20402 HC$3.00 MF$0.65

INTEGRATED CHECKOUT EQUIPMENT FOR THE MULTISTAGE ELDO VEHICLE.
Equipment Integre de Controle Et de Commande de Tir pour le Vehicule Multietage Eldo
European Space Vehicle Launcher Development Organization, Paris (France). Engineering Coordination Div.
B. Pottier, Feb 67, 33p ELDO-TM-E-18
Lang- in French and English

Descriptors: *Checkout, *Eldo launch vehicle, *Multistage rocket vehicles, Analog to digital converters, Countdown, Data processing, Launching, Onboard equipment, Prelaunch tests, Pulse code modulation, Sequencing, Telemetry, Time measurement.

For abstract, see STAR 06 10.
N68-20403 HC$3.00 MF$0.65

AAP-1A LAUNCH VEHICLE PERFORMANCE AND PRELIMINARY RANGE SAFETY ANALYSES. VOLUME 2 - RANGE SAFETY.
Chrysler Corp., New Orleans, La. Space Div.
J. M. Bartholomew, Nov 67, 37p NASA-CR-93656, SSR-107
Contract NAS8-4016

Descriptors: *Cape kennedy launch complex, *Missile ranges, *Range safety, *Saturn 1b launch vehicles, Downrange, Flight paths, Missile trajectories, Trajectory control.

For abstract, see STAR 06 10.
N68-20413 HC$3.00 MF$0.65

THE RELIABILITY OF A SPACE VEHICLE LAUNCHER SYSTEM - A THEORETICAL APPROACH.
European Space Vehicle Launcher Development Organization, Paris (France).
E. Cambi, Mar 68, 90p ELDO-TM-107

Descriptors: *Launchers, *Linear prediction, *Reliability engineering, *Statistical analysis, Asymptotic methods, Bayes theorem, Confidence limits, Destructive tests, Launch vehicles, Nondestructive tests, Probability theory, Quality control, Structural failure, Success project, Systems engineering.

For abstract, see STAR 06 10.
N68-20414 HC$3.00 MF$0.65

PROSPECTIVE EVALUATION OF HYBRID PROPELLANT ROCKET ENGINES FOR ELDO APPLICATIONS.
Office National D Etudes Et de Recherches Aerospatiales, Paris (France).
For primary bibliographic entry see Field 21H.
For abstract, see STAR 06 10.
N68-20493 HC$3.00 MF$0.65

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12B	AD-668 494	6M	JPRS-44295	20K	N68-19768	21H	N68-20064
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5G	AD-668 497	6M	JPRS-44341	4A	N68-19786	20K	N68-20069
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11F	AD-668 499	6E	JPRS-44434	9F	N68-19789	22D	N68-20071
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21E	AD-668 511	20H	LA-3842	17I	N68-19825	9D	N68-20115
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18J	ANL-7313	3B	N68-19516	3A	N68-19846	21C	N68-20187
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